



Marshall Space Flight Center

MSFC Center IT Governance and Organizational Alignment Plan

April 4, 2008

Prepared for: NASA Headquarters Office of the Chief Information Officer

Prepared by: Marshall Space Flight Center - Office of the Chief Information Officer

IMSB-Plan-2800.1



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This document is an official release of the Marshall Space Flight Center (MSFC) and is coordinated with MSFC organizational elements. Implementation guidance contained herein is concurred by and shall be implemented by MSFC organizational elements.

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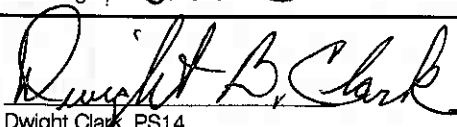
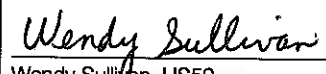
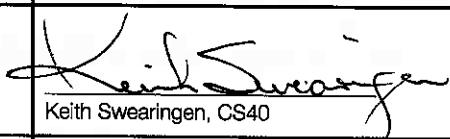
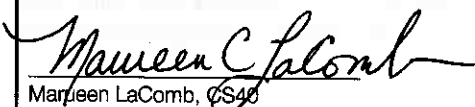
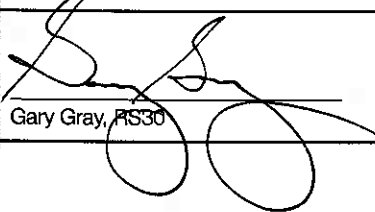
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The Center Implementation Team recommends Center management approval of the MSFC "Center Plan for Implementation of the Agency Strategy for Improving IT Management at NASA."



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This document provides the baseline for the MSFC IT Governance and Organizational Alignment Plan (MSFC Document IMSB-PLAN-2800.1).

This document is controlled by the MSFC Office of the Chief Information Officer (IS01) on behalf of the MSFC Information Technology Strategy and Investment Board (ITSIB).

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Executive Summary

Objective

Each NASA Center has been tasked with producing a plan that describes how it will implement IT governance and organizational realignment under the new Agency IT management strategies identified in the December 2007 release of the Agency's "Strategy for Improving Information Technology (IT) Management at NASA" by the NASA Office of the Chief Information Officer.

Agency Goals

The Agency's "Strategy for Improving Information Technology (IT) Management at NASA" implies broad change in the approach that Centers currently employ to ensure alignment of IT with the mission, improve collaboration across organizations, and better manage each Center's budget that is currently being invested in information technology each year.

Impact of Change

The change outlined in the "Strategy for Improving Information Technology (IT) Management at NASA" will have an impact on the policies, processes, and organizational structure at all Centers, including MSFC; on how IT investments are managed and balanced within the overall context of each Center's governance processes and investment portfolios; on clarifying the role of the CIO in delivering IT applications and IT infrastructure product and services; on the processes/tools that will be used to measure IT performance and provide cost transparency, and finally, how each Center will ensure the right composition/mix of skills and competencies of the civil servant and contractor workforce that will deliver the IT solutions required to meet mission and mission support requirements.

This document outlines the approach that MSFC will use to implement the key strategies presented in the Agency's "Strategy for Improving Information Technology (IT) Management at NASA." It will take time for MSFC to fully implement and realize the benefits associated with the Agency's new vision for IT management. Implementing the organizational, process, and technology change associated with implementing this new strategy will enable the Center and Agency to invest and deliver the right IT solutions that deliver the greatest benefit to the NASA mission. How well the Center executes this plan depends in large part on the willingness of the leadership team and employees to understand, embrace, and manage change.



Center Plan Contents

In guidance issued in early December 2007, the Agency CIO outlined the approach for each Center to use in developing their implementation plan. Specifically, the Agency CIO asked each Center to:

- Document the Center transition approach to developing the implementation plan
- Document the current Center governance structure
- Identify a proposed IT governance model that aligns with the Agency IT governance strategy
- Document the Center CIO role in the IT Acquisition Process
- Identify any realignment needed to meet NPD 1000.3 and the SMC IT strategy
- Document the current Center CIO organizational alignment with the defined CIO core functions
- Identify the Center CIO approach to fulfilling the relationship manager and enterprise architect functions
- Document service level agreements and metrics for the Center's IT service delivery capability
- Document a transition plan and schedule to effect changes

MSFC's IT Governance and Organizational Alignment Plan approach is consistent with the above guidance. This document consists of three major sections. Section One restates the significant components of the Agency strategy in order to frame the contents for Section Two, which contains the Center's approach to implementing IT governance and aligning the CIO organization to fulfill the core functions described in the Agency's strategy. Section Three provides high level tasks to be implemented in each of the key areas.

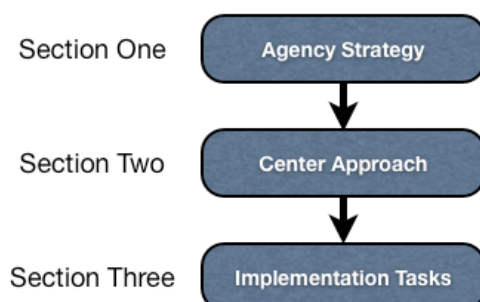


Figure 1 - Center Plan Contents



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Agency Strategy and How MSFC Will Meet Requirements

The MSFC IT Governance and Organizational Alignment Plan aligns the five Agency IT strategy requirements with implementable actions at the Center.

IT Governance

The requirement was to develop a Center IT governance model that allows for alignment of IT solutions with mission needs and links the CIO change and programmatic chain for IT decision making, while rethinking the traditional mission and institutional IT models.

How MSFC Will Meet the Requirement

- a. Establish an IT governance structure at the Center that ensures that key stake holders and decision makers are engaged to maximize the contribution of IT solutions towards accomplishing Center goals and objectives by delivering architecturally compliant, insertion-ready technologies that are effectively managed for risk and cost.
- b. Creation of an MSFC IT Strategy and Investment Board, a subcommittee to the MSFC IMSB to review, discuss, and make recommendations to the Center/Agency with regard to IT strategy, policy, architecture, IT portfolio investment planning, and IT portfolio performance management.
- c. Formulation of an MSFC Enterprise Architecture Advisory Committee to provide a Center-wide approach to IT requirements integration, IT investment business case preparation, enterprise architecture alignment, IT portfolio management and IT configuration change control.

IT Financial Management

The requirement was to implement an IT financial management strategy to create better visibility into the entire IT budget and allow for improved IT investment decision making.

How MSFC Will Meet the Requirement

- a. Analyze the current state and accuracy of tracking IT procurements to determine what is currently being spent on IT at the Center and whether current processes and controls are adequate to ensure the appropriate levels of visibility and support effective IT decision making.
- b. Vest the MSFC IT Strategy and Investment Board with the responsibility and authority for evaluating, selecting, prioritizing, and recommending to the MSFC IMSB potential investments that exceed infrastructure and applications investment thresholds.
- c. Require development/documentation of an initial IT Summary Investment Business Case for all IT applications and infrastructure to include initial business benefit analysis, business driver and system level requirements, alternative analysis, risk analysis, return on investment, funding requirements, and schedule.



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- d. Require the MSFC CFO to complete an assessment and recommendation for improvement of procurement initiation processes and controls. Ensure that only trained and knowledgeable users generate transactional data in the Agency's SAP system. Strengthen user support and management control processes for all IT requisitions, including PRs, bank card, and support contractor purchases.

IT Application Portfolio Management

Develop an IT applications portfolio management process, consistent with the Agency IT portfolio management process, for organizing and managing applications and integration standards at the Center level.

How MSFC Will Meet the Requirement

- a. Implement an Application Portfolio Management (APM) framework that leverages a portfolio view of existing IT to easily organize applications into relevant categories for decision making, consistently evaluate the relative importance and performance of steady-state applications, prioritize which assets require resources (people and \$s) in any given budget cycle, and identify where the Center should spend money or apply management cycles.
- b. Within the context of the APM framework, establish portfolio and sub-portfolios for the science and engineering, business management, project management, and IT infrastructure domains to enable better understanding of the full spectrum of business capabilities and issues for a specific business area, facilitate and inform future discussion and action, and respect and enforce boundaries of NASA's architecture, standards, governance, and strategic direction.
- c. Continue to participate in the Agency Applications Portfolio Management process, apply guidance to manage the IT applications portfolio at MSFC, assess in-place applications against defined criteria and portfolio objectives, and better inform the Capital Planning and Investment Control (CPIC) and Program Planning Budget Execution (PPBE) processes.

IT Infrastructure

The requirement was to develop a framework and management model for the collective IT structure going forward, including a master planning process and funding approach for the IT infrastructure

How MSFC Will Meet the Requirement

- a. Develop and refine infrastructure operational models to specify data center, network consolidation, and infrastructure operations to-be states.
- b. Develop a comprehensive Service Level Agreement (SLA) - based service catalog and cost recovery model for IT system management, e.g., floor space, security, operating system and storage management, network connectivity, and disaster recovery/continuity of operations.
- c. Encourage consolidation of IT resources and establish baseline provisioning of infrastructure services.
- d. Revise acquisition/sourcing strategies for end-user, communications, and data center services.



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Organizational Design and Staffing Strategy

The requirement was to develop an organizational model that aligns with and enables the execution of the Agency IT management model.

How MSFC Will Meet the Requirement

- a. Provide regular assessments of best-practice competencies, skills, and capabilities to ensure the CIO workforce is fully aligned with the nine core functional areas - Governance and Policy, Enterprise Architecture, IT Security, Resource Management, Relationship Management, Innovation Management, IT Service Management and Delivery, Project Management, and Performance Management.
- b. Implement a relationship management model that ensures strong alignment of customer expectations, IT capabilities, and process/performance management.
- c. Expand the role of IT solutions architects to oversee the planning, design, development and implementation of enterprise architecture segments and ensure the development and documentation of standards, policies, and principles that support enterprise architecture activities at MSFC.
- d. Strengthen IT Security core capability to provide improvements in IT security planning and management, security architecture, operations, compliance, and continuity of operations planning and disaster recovery.
- e. Implement an IT innovation management framework to provide a disciplined approach to identifying trends in IT advancements and methods to systematically evaluate candidate technologies, thereby ensuring that MSFC invests in the right IT solutions that provide the greatest benefit to the mission.
- f. Implement a software engineering framework process to identify standards for software architecture and development, standards for development of software development plans, and software engineering process activities.
- g. Formalize a collaborative IT project management capability within the MSFC CIO to improve IT project formulation, project management coordination and oversight, and investment performance reporting.
- h. Formalize IT operations roles within the MSFC CIO to review and improve the management of Center IT operational systems and configuration/change control board oversight, portfolio performance oversight, and IT community of interest coordination.
- i. Expand the development and implementation of CIO performance measurement capabilities for key management emphasis areas - costs/financial, people, security, innovation and value generation, product and service delivery, and quality of IT projects.



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Assumptions for Success

The following assumptions are made with regard to successful implementation of the MSFC IT Governance and Organizational Alignment Plan

- Implementation of the Agency IT strategy requires a major cultural / paradigm shift at MSFC.
- Center management must fully endorse the Agency IT strategy and agree to actively support and enforce the policy, process, and organizational change that will be required to implement the strategy at MSFC.
- Agency and Center management must address attempts to end-run the newly established Center processes.
- Significant change will be required - cultural, procedural, organizational, etc., and communication and change management of the strategy (up-and-out and down-and-in) is essential. A communications plan will be developed in conjunction with the Office of Human Capital.
- Budget authority must be aligned with the Center's IT governance model.



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Risk Analysis

The MSFC has identified the following risks associated with the MSFC IT Governance and Organizational Alignment Plan.

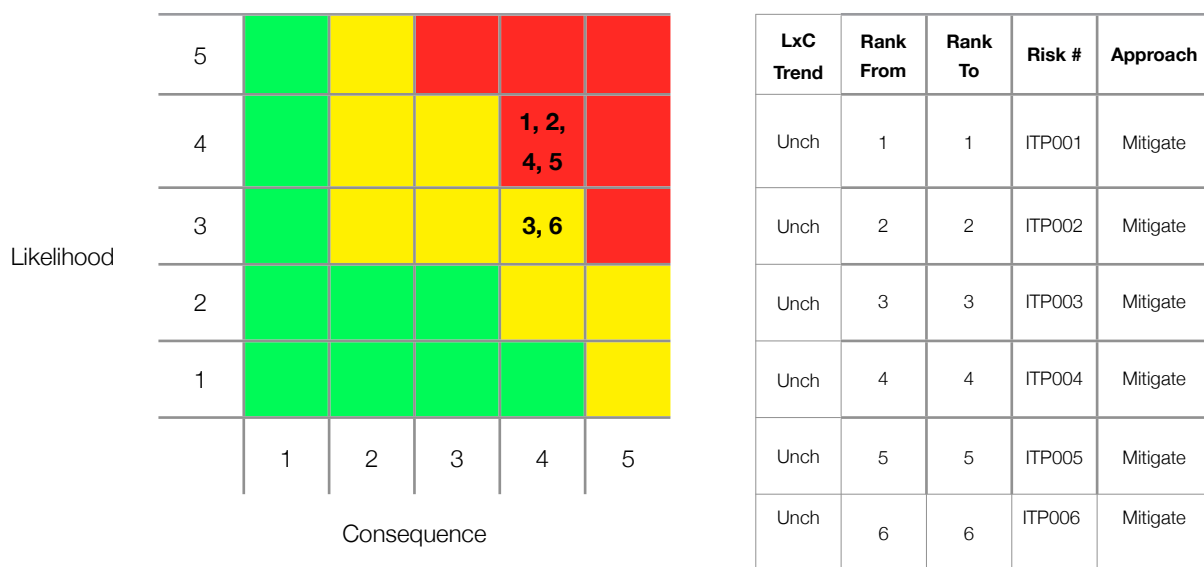
Criticality Risk Total L/C	Risk ID - Title Risk Statement Risk Plan	Owner Category Team	Status Timeframe Approach
H 16 4/4	ITPLAN-001 - IT Strategy Cultural / Paradigm Shift Given the implementation of the Agency IT strategy requires a major cultural / paradigm shift at the Center; there is a possibility that disconnects and delays will develop in organizational elements that will impact the Center's ability to implement the plan in a timely manner.	John McDougale IT Plan CIO / IS01	Open Far (18 Mo.) Mitigate
H 16 4/4	ITPLAN-002 - IT Governance Model Alignment Given a current Center IT governance structure that is not aligned with the Agency IT governance strategy, there is a possibility that failure to establish an MSFC IT Strategy and Investment Board and MSFC Enterprise Architecture Advisory Committee will result in an ineffective IT governance process.	David Earnest IT Plan IMSB / IS20	Open Near (6 Mo.) Mitigate
M 12 3/4	ITPLAN-003 - IT Financial Management Given the current issues with tracking IT procurements, there is a possibility that failure to adopt recommendations to improve IT financial management will result in processes that do not offer improved IT budget visibility and decision making.	Gary Gray IT Plan CFO / RS30	Open Mid (12 Mo.) Mitigate
H 16 4/4	ITPLAN-004 - Application Portfolio Management Given the Center does not implement an IT application portfolio-level segmentation process, there is a possibility that the Center will not be able to manage applications architecture and integration at the enterprise level.	Sheila Fogle IT Plan CIO/IS30	Open Mid (9 Mo.) Mitigate
H 16 4/4	ITPLAN-005 -Alignment of IT Budget and Governance Alignment Given that budget authority is not currently aligned with the Center's proposed IT governance model, there is a possibility that the Center will be unable to implement the required master planning process and funding approach for IT infrastructure and applications management.	CFO IT Plan IMSB	Open Mid (6 Mo.) Mitigate
M 12 3/4	ITPLAN-006 - Alignment of Organizational Structure for IT Given the current Center IT organizational structure and capabilities (people, processes, and technologies), there is a possibility that the Center will be unable to fully execute the Agency's new IT management model.	John McDougale IT Plan CIO / IS01	Open Mid (6 Mo.) Mitigate

Table 1 - NASA's IT Portfolio Segmentation

Risk Matrix



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	Current			30 Days Ago			60 Days Ago			90 Days Ago		
H,M,L	4	2	0									
Open	6											
Closed	0											
New	6											

Figure 2 - Risk Matrix

These risks will be tracked by the MSFC Office of the CIO as part of its monthly risk management review.



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Section One - **Agency Strategy**

Background

The Need For A New IT Management Strategy At NASA

On January 14, 2004, President George W. Bush gave NASA a defining challenge for the 21st century with compelling new objectives outlined in “A Renewed Spirit of Discovery: The President’s Vision for Space Exploration.” NASA’s Exploration Program commits our Nation to a new journey of exploration of the solar system, beginning with the return of humans to the Moon by the end of the next decade, and leading to subsequent landings on Mars and other destinations, such as near-Earth asteroids. The fundamental goal of NASA’s Exploration Program is “to advance U.S. scientific, security, and economic interest through a robust space exploration program.”

Effectively and efficiently managing, preserving, protecting, and disseminating the information required to achieve, and resulting from, exploration and other NASA missions are vital to mission success. Seamless collaboration of the NASA workforce across multiple Centers will be vital in the planning, design and development of mission-related capabilities and technology in the future.

NASA’s senior leadership team determined that a significant transformation of the Agency’s IT management model is required to better enable NASA’s mission by integrating people, processes, technology, and information. The “10 healthy Centers” model requires significant collaboration to achieve mission success. Changes in the IT management model are also required to improve security and to achieve efficiencies in NASA’s IT infrastructure and applications. NASA leadership has recognized the fundamental relationship that exists between mission success and IT and the need to better manage IT strategically and tactically Agency-wide.

Current State of Information Technology Within NASA

The Office of Program Analysis and Evaluation (PA&E) initiated and completed an assessment of the state of NASA Information Technology (IT) in April 2007. This assessment resulted in the realization that there are a number of misalignments between the management of NASA IT and the overall NASA mission and the NASA Strategic Plan. Specifically it was identified that:



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- NASA needs to be more efficient with investments in IT. The Agency currently spends approximately \$2.2 billion on IT, which equates to roughly 13 percent of the total NASA budget. The typical U.S. Government organization spends around 7–9 percent of their budget on IT.
- There is an inconsistent understanding of how IT is managed within NASA and the role the Chief Information Officers (CIO) play.
- NASA experiences a proliferation of tools and lack of standards to enable integration, thereby making it difficult to work seamlessly across Center boundaries.
- The NASA CIO function is detached from the mission and seen as the source of unfunded mandates and bureaucracy.
- The mission programs don't trust the "institutional IT organization" to deliver mission value.

Strategy to Align Information Technology With The Mission

The Agency Office of the CIO (OCIO) was tasked by the NASA Strategic Management Council (SMC) to address these problems by developing a strategy (in close collaboration with the Center and Mission Directorate CIOs) that will enable the NASA IT environment to be fully aligned with the NASA Mission and Strategic Plan. Specifically, the Agency OCIO was tasked to:

- Develop plans to implement an IT authority model using an approach similar to the Office of Chief Engineer (OCE) and Office of Safety and Mission Assurance (OSMA) structure for technical authority.
- Revise NPD 2800.1A, Managing Information Technology and NPR 2800.1, Managing Information Technology, with Changes, as governing documents for Agency IT management.
- Work with the OCE and PA&E to develop an application management process that organizes the Agency's investments in IT tools and applications to ensure integration and eliminate unnecessary duplication.
- Develop a detailed IT infrastructure management strategy that outlines the path forward for implementing and managing the Agency's end user devices (desktops, PDAs, etc.), networks, and data centers, to ensure seamless collaboration Agency-wide.
- Work with the NASA Office of the Chief Financial Officer (OCFO) and the Office of Program and Institutional Integration (OPII) to establish an improved methodology to ensure visibility of IT resources in the budget and accounting structure.

Four working groups with Agency OCIO, Mission Directorate and Center representation were formed to address the specific tasks in the area of IT Governance and Organization, IT Infrastructure, IT Financial Management, and IT Application Portfolio Management. The working group results, which included specific recommendations and plans, were approved by the SMC on September 13, 2007.



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In December 2006, in response to direction from the NASA SMC, the Agency OCIO, in collaboration with the Center and Mission Directorate CIOs, and consultation with key stake holders, developed and published the “Strategy for Improving Management of IT at NASA.” This strategy documented the Agency’s vision for IT management and defined four principles to guide the Agency in planning and implementing information technology investments.

Vision For IT Management at NASA

The purpose of IT at NASA is to enable the mission and deliver mission value through the use of information technology. To achieve this purpose the Agency OCIO has defined the following vision for the future of IT at NASA:

- NASA invests in the right IT solutions that provide the greatest benefit to the NASA mission.
- IT systems are seamlessly deployed and utilized across Center boundaries.
- IT projects selected and executed by NASA provide expected benefits, such as return on investment, improved collaboration capability, improved security, etc.
- IT at NASA makes information accessible, integrated and actionable for mission programs.
- NASA CIOs provide a reliable, efficient, secure, and well-managed IT infrastructure that customers rely on rather than compete with.
- NASA CIOs are credible, trusted partners in solving mission and business problems.

NASA IT Principles

NASA Leadership identified the following four characteristics to describe the IT environment to which NASA aspires, and which will serve as principles to guide IT decisions and planning within the Agency.

- *MISSION ENABLING*: IT at NASA serves to enable NASA's mission.
- *INTEGRATED*: NASA will implement IT that enables the integration of business (mission) processes and information across organizational boundaries.
- *EFFICIENT*: NASA will implement IT to achieve efficiencies and ensure that IT is efficiently implemented.
- *SECURE*: NASA will implement and sustain secure IT solutions.



Strategy For Change In IT Management

The Agency “Strategy for Improving IT Management At NASA” provides clear guidance and direction for change in how IT will be managed within the Agency. This strategy encompasses five specific directions and initiative areas:

- *IT Governance*
- *IT Financial Management*
- *IT Application Portfolio Management*
- *IT Infrastructure*
- *Organizational Design and Staffing*

NASA's IT Governance Strategy

Within the “Strategy for Improving IT Management At NASA,” the Agency CIO has identified a structured, decision-oriented governance model that segments NASA's IT environment into three major areas or portfolios: IT Infrastructure, IT Applications, and Highly Specialized IT (for example, technology that supports real-time control systems and on-board avionics).

The scope of the governance strategy within the Agency's new model for IT management excludes Highly Specialized IT. Program and project management of Highly Specialized IT continues to be governed subject to existing structures and processes already in place, and in accordance with NPR 7120.5 “Space Flight Program and Project Management Requirements.”

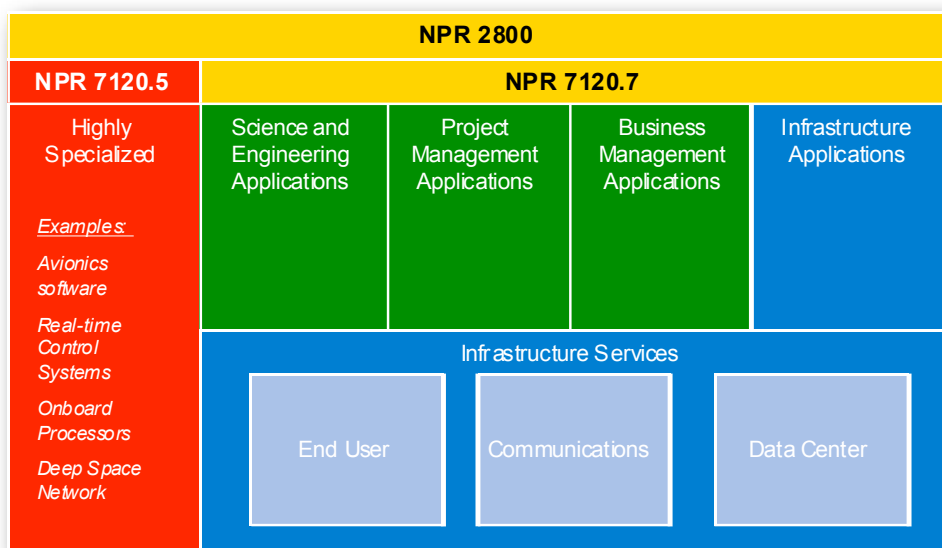


Figure 3 - NASA's IT Portfolio Segmentation



NASA's decision to employ the three-board IT governance model, shown in Figure 4 below, provides complete coverage of the life cycle of an IT investment from the initial decision to fund a proposed investment, to oversight of its implementation and operations, and decommissioning.



The three-tier IT governance model provides alignment to the Agency Operations Management Council and decision mechanisms to evaluate IT strategy and investments, manage IT program development activities, build and operate IT infrastructure and applications, and measure how well IT enables the mission at NASA.

Figure 4 - Agency IT Governance Structure

This model is consistent with the overall Agency governance model and provides effective mechanisms for ensuring decisions are made in consultation with, and with the concurrence of key stake holders, and provides an escalation path mechanism to the Agency Operations Management Council if necessary. The roles of the three Agency IT governance boards are outlined below:

- *Agency IT Strategy and Investment Board (ITSIB)* - Decisions regarding IT strategy and related investments (prioritization and selection), Enterprise Architecture, and NASA-wide IT policies/ processes. Members include Agency CIO (chair), senior level stake holders from Mission Directorates, Mission Support Offices, and Centers.
- *Agency IT Program Management Board (ITPMB)* - Decisions regarding application and infrastructure projects to ensure that investments approved by the ITSIB stay on track during formulation, design and implementation. Members include the Deputy CIO (chair), Deputy Chief OCIO Policy and Investment Division, IT Management Board Representative, IT Management Board, Office of the Chief Engineer, representatives from Mission Directorates, Mission Support and Centers.



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- *Agency IT Management Board (ITMB)* - Decisions regarding operational performance and issues. Members include the Agency CIO (chair) Associate CIO for Architecture and Operations, the Deputy CIO for IT Security, Center and Mission Directorate CIOs.

The Agency anticipates that it will take several years to achieve complete fluency with the proposed IT governance structures and implement the mechanisms to improve the visibility and accountability of IT investments and rationalize the redundancies and address inefficiencies in the current environment.

NASA's IT Financial Management Strategy

The IT Financial Management strategy intends to leverage existing processes, tools, and policies as much as practical and create new ones where appropriate. The following elements are included in the overall IT Financial Management strategy:

- Funding and Investment Controls, including establishing a “base-services” funding strategy and new Investment Selection and management disciplines.
- Costing and Charge-back Processes, including the methods for processing charges for over-and-above base service provisioning.
- Budgeting/Actuals Tracking, including the processes and tools to be used in capturing full transparency into demand for IT services and actual dollars spent.
- Benefits Realization, including the processes for determining the value received for IT services delivered and the ability to continue to mature and grow processes and disciplines.
- Control and Coordination, including how the CIO organization will enable the new IT Financial Management strategy.

NASA's IT Portfolio Management Strategy

The IT Application Management strategy intends to leverage a portfolio view of existing IT application assets throughout NASA with the objective of improving the performance of the individual assets within the portfolio as well as the performance of the portfolio as a whole. The process begins by establishing portfolio-level performance objectives that ensure that the current and future requirements of the mission and programs will be met in the most efficient way.

The Agency's short-term goals of moving to an application portfolio program are to:

- Create a basis for a consistent set of application-related discussions.
- Develop a platform for communicating the status of the application environment.
- Determine the overall IT skills required to support NASA's business environment.



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- Learn how NASA's applications interact with each other (or don't) to support NASA's future goals of collaboration.

Longer-term, the goals of the Agency's IT Portfolio strategy are to:

- Reduce the total number of applications that are being developed and sustained (from 2,500 to a significantly lower number).
- Reduce complexity of the application and platform environment.
- Identify major issues associated with applications or groups of applications.
- Identify improvements to established applications and new applications that cross traditional program and Center boundaries.
- Realize cost avoidance through economies of scale and enterprise licensing.
- Lower data center/infrastructure costs through decommissioning and consolidation.

NASA's IT Infrastructure Strategy & The Role of the CIO

NASA's IT Infrastructure comprises the hardware, software, and processes that together deliver fundamental IT capabilities in support of NASA users, application systems, and data. To meet these challenges, the NASA IT Strategy includes guidance on three aspects of the NASA Infrastructure:

- Infrastructure Definition. A new framework and taxonomy for describing NASA Infrastructure, using Infrastructure Services as a basic building block.
- Infrastructure Management. A strategic approach for planning and managing NASA's Infrastructure throughout the infrastructure life cycle, relying in large part on enterprise-wide management for enterprise-wide services.
- Infrastructure Architecture. A number of required changes to the high-level architecture of certain critical Infrastructure technologies, including networks, end-user platforms, and data centers.

NASA's IT model divides IT Infrastructure into four categories; End User Services, Communications Services, Data Center Services, and Infrastructure Applications. The relationship of these Infrastructure categories with other NASA IT portfolios is illustrated in the Figure 5 below.

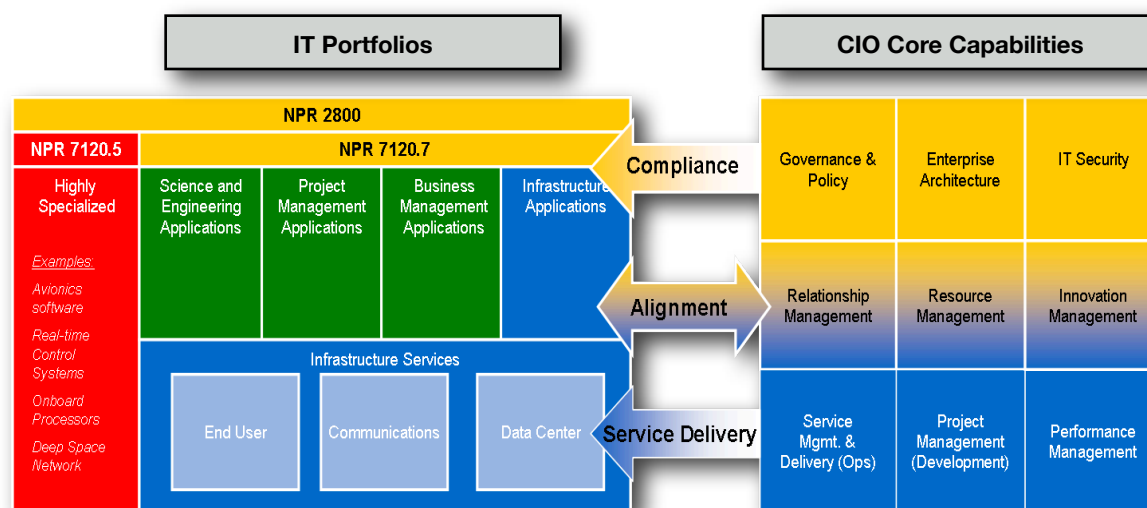


Figure 5 - Alignment of IT Portfolios and Role of the CIO in Managing IT

- Mission Directorates have responsibility for Highly Specialized IT that is an embedded component of a flight system, experiment, simulator, ground support environment, or mission control center. This responsibility does not necessarily extend to the IT infrastructure that supports the Highly Specialized IT components.
- The Centers, Mission Directorates, and Mission Support Offices have responsibility for managing the portfolio of Science and Engineering Applications, Project Management Applications, and Business Management Applications.
- The CIO is responsible for Infrastructure Applications and Infrastructure Services, including end user, communications, and data center services, as well as for all aspects of the IT Infrastructure in which Science and Engineering applications, Project Management applications and Business applications reside.

NASA's IT Organizational Design and Staffing Strategy

The success of the Agency's IT management strategy depends upon the ability of the OCIO organization to provide consistent, quality services, align technology with mission requirements, and ensure compliance with policy across all Centers.

The required organizational capabilities include not only the skills and competencies of the civil servants and contractors that make up the CIO organization, but also the policies, governance structures, and process disciplines that guide and deliver the services and the platform for meaningful, ongoing communication between IT and the Mission Directorates and programs.



The core capabilities identified in Figure 5 above are required to complete a successful transition to an improved NASA IT model. These core capabilities are necessary in all CIO organizations. However, Center CIO organizations may not be currently staffed to support all nine of these functions, and areas that are staffed may not be executed consistently across the Centers.

Figure 6 outlines the NASA strategy for how Centers are expected to support the new IT service delivery environment.

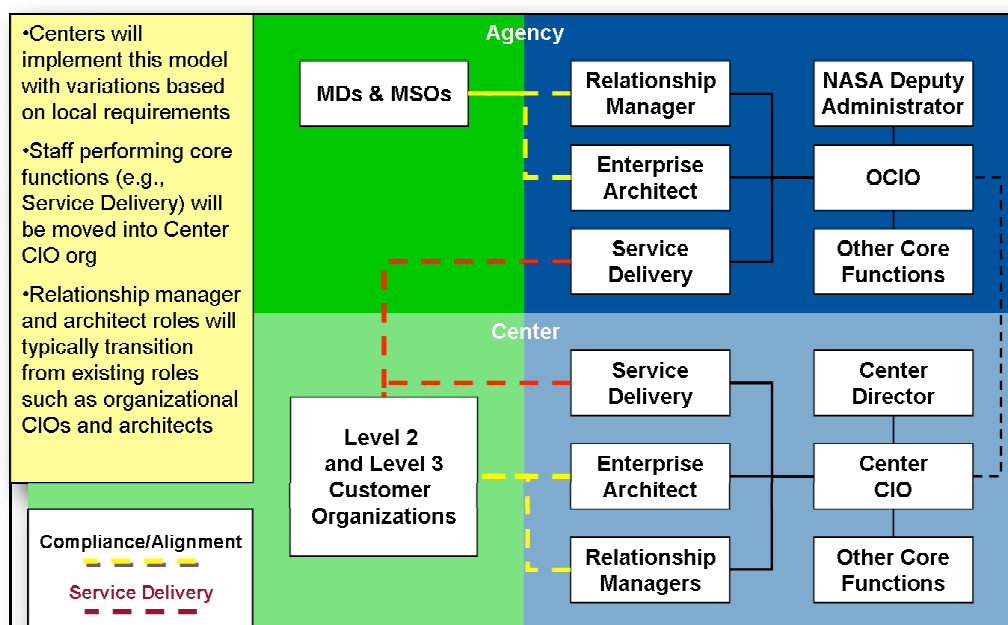


Figure 6 - Agency Model For IT Organizational Design



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Section Two -

MSFC IT Governance and Organizational Alignment

Center Transition Approach

The “Strategy for Improving Information Technology Management at NASA” represents a transformational shift in how the Agency views the role of IT in achieving mission success, and how the Centers should develop plans to integrate people, processes, technology, and information to provide an IT management model that can evolve and adapt to emerging mission requirements.

The Agency’s new IT management model, built around five key strategy areas - IT Governance, IT Financial Management, IT Application Portfolio Management, IT Infrastructure, and Organizational Design and Staffing – is designed to:

- Enable collaboration between mission and mission support organizations
- Provide a customer focus to the provisioning of common IT services.
- Protect and secure the Agency’s information assets.
- Optimize the Agency investments in IT infrastructure and applications through a managed portfolio approach.
- Ensure that an IT workforce with the right skills, capabilities, and competencies is positioned to meet the needs of the Agency.

Effective management of the Center’s IT assets requires a life-cycle approach to identifying, prioritizing, selecting, developing, implementing, and retiring IT investments. The Center’s approach to implementing an IT governance model and a realigned CIO organization in concert with the Agency strategy will ensure effective life-cycle management of IT assets, including provisions to assess and document mission needs and requirements; identify, characterize, and validate architecturally compliant technologies; prioritize, select, and control IT investments; develop, implement, and track the performance of IT project initiatives; and protect and secure the Agency’s information resources.



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MSFC's goal is to leverage existing processes, tools, and policies as much as practical, only creating new ones where absolutely necessary.

Formation of the Center Implementation Team

A Center Implementation Team was assembled to review and assess the impact of the Agency strategy and recommend a Center approach to IT governance and realignment of core functions within the CIO organization. The implementation review team included representation from key stakeholder areas within the Mission and Mission Support areas of the Center:

- Office of Strategic Analysis and Communications
- Office of Center Operations
- Office of the Chief Financial Officer
- Office of the Chief Information Officer
- Office of Human Capital
- Engineering Directorate
- Science and Mission Systems
- Ares Projects Office
- Safety and Mission Assurance Office

A series of informational briefings was conducted with Center leadership, key stake holders, and customers to review the Agency strategy and raise the level of awareness, gain buy-in and support, and discuss concerns and issues. Center leadership has given general concurrence to the Agency strategy for improving IT management, although details of implementing all of the strategies remain to be fully defined and implemented.

Many concerns and questions have been surfaced and discussed regarding the impact of organizational realignment and the processes associated with IT governance, IT infrastructure service delivery strategy, and management of the Center's IT investment portfolio. However, further discussion and understanding will be required to fully characterize the impact that the new strategy will have on current policy, processes, and organizational structure.

Alignment Plan Approach

MSFC's approach to implementing its IT Governance and Organizational Realignment Plan under the Agency strategy for IT management is based on a mission-centric six-phase model involving close collaboration and partnership among customers and stake holders and the CIO organization.

Figure 7 below, outlines the notional approach used by the Center Team to develop the plan. This framework model involves a period of discovery and understanding, followed by developing a future state vision for each of



the strategy areas. Once the as-is and future states have been defined, a gap analysis can be performed for processes, capabilities, and organizational structures that are required to support the future state.

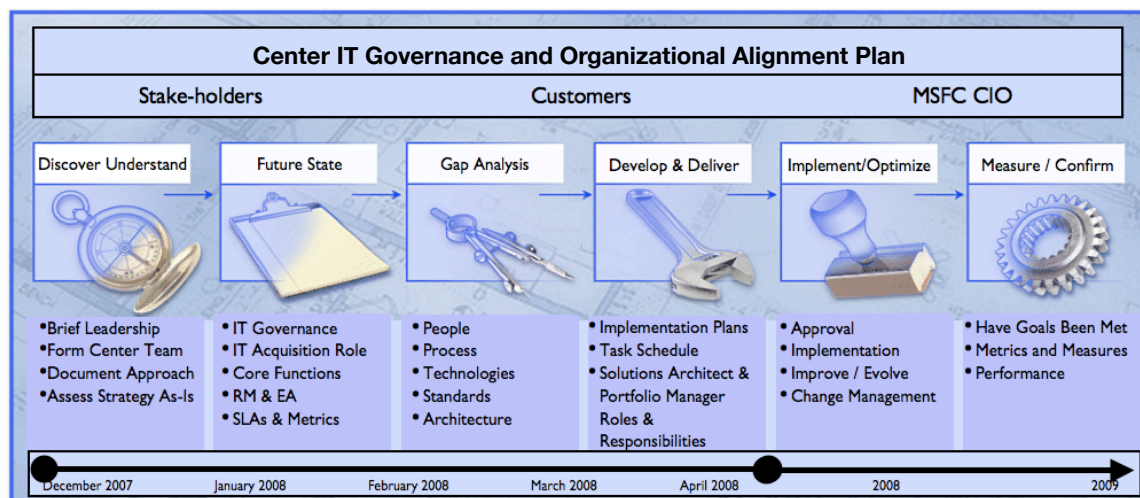


Figure 7 - Process for Developing the MSFC IT Governance and Realignment Plan

From the gap analysis, detailed implementation plans will be developed. As the plans are approved by Center management and concurred by the Agency CIO, the Center will begin implementation and optimization, evolving the initial plan over time as required. The last step in the process involves measuring and confirming that the planned results have been achieved. Successes will be documented and where needed, the process will be repeated and modified to ensure the strategies are effectively implemented.

The Center is currently working within the period of discovery and understanding, and is developing the future state vision with regard to the Agency's new IT management strategy. Gap analyses have been performed for some areas and will continue for areas not yet fully defined. The Center has developed this initial plan which generally follows the recommended approach from the Agency CIO.

- Documents the Center transition approach to developing the implementation plan.
- Documents the current Center governance structure.
- Identifies a proposed IT governance model that aligns with the Agency IT governance strategy.
- Documents the Center CIO role in the IT acquisition process.
- Identifies any realignment needed to meet NPD 1000.3 and the SMC IT strategy.
- Documents the current Center CIO organizational alignment with the defined CIO core functions.
- Identifies the Center CIO approach to fulfilling the relationship manager and enterprise architect functions.
- Documents service level agreements and metrics for the Center's IT service delivery capability.
- Documents the transition plan schedule to effect changes.



Current Center Governance

MSFC Center Governance Structure

MSFC's current governance structure, shown in Figure 8 below, provides for three governing councils - the Strategic Planning Council (SPC), Center Management Council (CMC), and Integrated Management Systems Board (IMSB), MSFC's governance councils are fully aligned with the Agency's overall governance model, as described in NPD 1000.0 Strategic Management and Governance Handbook, and provide highly effective mechanisms to facilitate the alignment and execution of the MSFC management system and leadership.

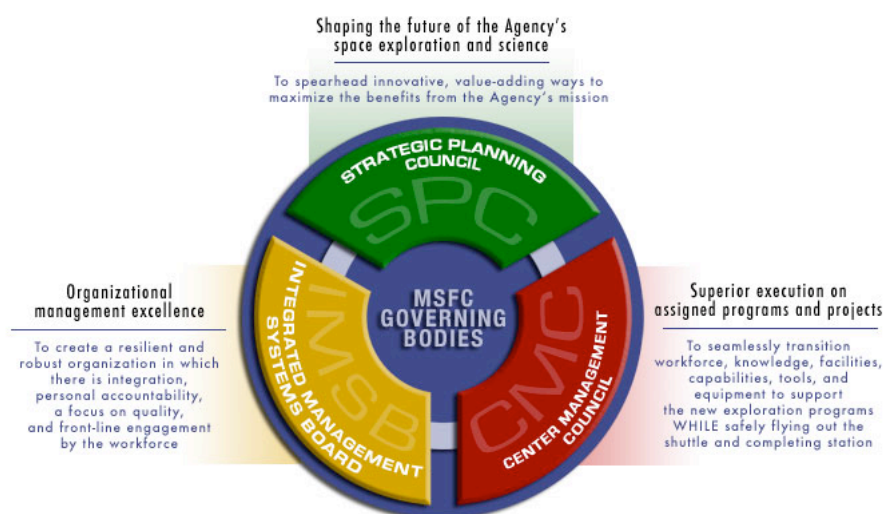


Figure 8 - MSFC Governance Structure

The MSFC SPC provides the forum to discuss strategic issues when visibility, integration, and understanding are needed to drive organizational alignment to Center goals and objectives. The MSFC SPC discusses overall Center progress toward strategic goals, organizational structure, product lines and management models, investment priorities, and stakeholder and customer relationships. The MSFC Center Director chairs the SPC. MPD 1000.1, "MSFC Governance" is the defining authority for the MSFC SPC.

The MSFC IMSB provides a Center forum to discuss institutional issues when visibility, integration, and understanding are needed to drive organizational alignment to Center goals and objectives. The MSFC IMSB discusses issues that involve enabling resources such as people, processes, infrastructure, and money for performance and product/service delivery. The MSFC Associate Director chairs the IMSB. MPD 1000.1, "MSFC Governance" is the defining authority for the MSFC IMSB.



The MSFC CMC provides a Center-level forum to evaluate technical performance of program and project work and to ensure adequate technical and institutional resources are applied to satisfy program requirements and schedules. The MSFC CMC evaluation focuses on whether MSFC Engineering, and Safety and Mission Assurance standards and management practices (i.e., resources, procurement, institutional) are being followed by the program/project under review and whether MSFC resources can support program/project requirements. The MSFC Director chairs the CMC and the MSFC Deputy Director serves as the Alternate Chairperson. NPR 7120.5, "NASA Space Flight Program and Project Management Requirements, and MPD 1000.1", "MSFC Governance" are the defining authorities for the MSFC CMC.

Current IT Governance At MSFC

MSFC currently has a number of policies and Center work instructions regarding IT management and IT service delivery, two institutional governance committees that report to the Center governance councils, and a large complement of employees located in organizations outside of the Office of the Chief Information Officer and serve as computer security officials, IT managers, and departmental/organizational IT managers.

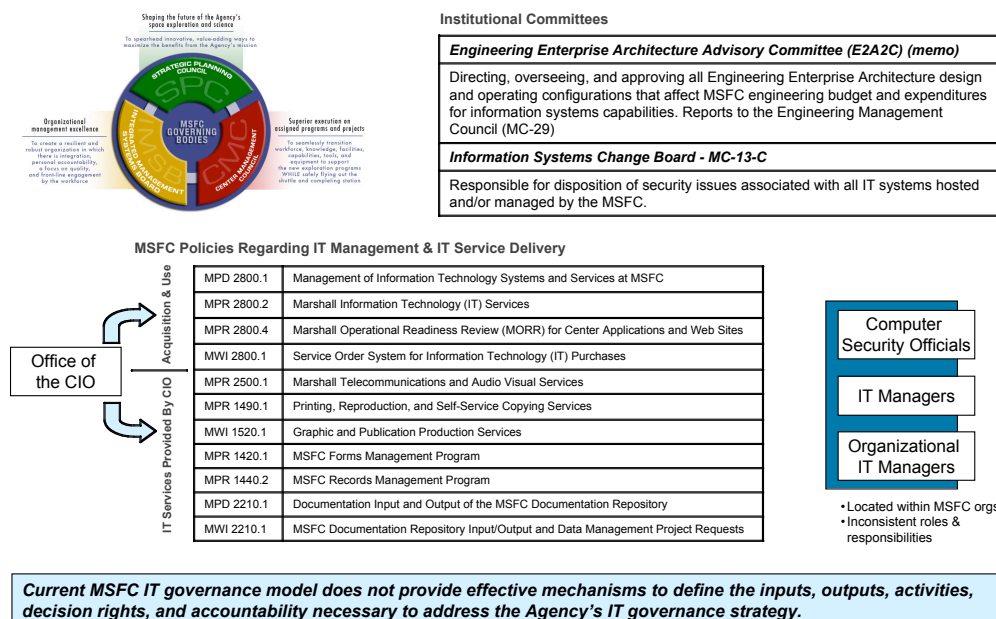


Figure 9 - MSFC Current IT Governance - Policy, Committees, and Secondary IT Support Capability

MSFC's current IT policy documents are divided into two categories that govern (1) acquisition/use of IT products and services, and (2) IT product and service delivery by the CIO organizations. Four documents



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govern the acquisition and use of IT products and services, and seven documents govern the delivery of IT products and services.

Two institutional committees are currently in place and report to the MSFC IMSB and the CMC. The Engineering Enterprise Architecture Advisory Committee (E2A2C) is responsible for the direction, oversight, and approval of all MSFC engineering architecture design and operating configurations that affect MSFC engineering budget and expenditures for information systems capabilities.

The MSFC E2A2C is aligned with the MSFC Engineering Management Council (EMC) and makes periodic reports and recommendations to the IMSB.

The Information Systems Change Board (ISCB), an officially-chartered MSFC board (MC-13-C), is responsible for the disposition of security issues associated with all IT systems hosted at and/or managed by MSFC.

MSFC currently has 38 non-OCIO employees serving in secondary IT support roles as IT Managers (ITMs), Computer Security Officials (CSOs), organizational IT Managers (OITMs). The percentage of time each of these individuals spends performing these duties varies depending on the organization to which they are assigned. In most cases these individuals spend approximately 40-60% of their time providing secondary IT support capability with their respective organizations.

How The Current IT Governance Structure Aligns With Agency Strategy

MSFC's current IT governance model does not provide optimal mechanisms to define the inputs, outputs, activities, decision rights and accountability across the Center that is necessary to fully address the Agency's IT governance strategy.

The current governance model does not provide for on-going top management discussion of overall IT strategy and how IT should be effectively managed to meet mission and mission support capabilities.

The current IT governance model does not provide for a consolidated approach to discussion and decision relating to the enterprise architecture, standards, and policy, and it does not provide for a consistent approach to managing the life-cycle for IT investments across MSFC organizations.

These issues are addressed in the future state governance model for the Center.



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Current Role of the CIO in Center IT Acquisition Process

Current Policies That Govern IT Acquisition At MSFC

Currently MSFC has established directives and other guidance that govern IT acquisition and IT management at the Center.

1) MPD 2800.1 Management of IT Systems and Services at MSFC (effective 01/29/2007)

MPD 2800.1 Management of IT Systems and Services at MSFC establishes organizational authority, policies, and responsibility that govern the acquisition, management, provisioning, and use of IT products, services, and support contracts within the scope of MSFC. This directive is applicable to all MSFC organizations, support contractors, and other supporting organizations regardless of location.

MPD 2800.1 establishes Center policy that MSFC shall comply with applicable Agency and Government IT standards and specifications and that MSFC IT products and services shall be provided by or through the appropriately chartered Center organizations.

Under MPD 2800.1, the MSFC CIO is chartered as primary source of IT capabilities and resources. Therefore, to maximize efficiency, reduce duplication of effort and hence the overall cost to the Agency, Directorates shall engage the MSFC CIO to provide IT services to satisfy IT requirements. The MSFC Engineering Directorate (ED) is currently chartered as MSFC's primary source of ground systems IT capabilities and resources that support space flight systems. Therefore, to maximize efficiency, reduce duplication of effort and hence the overall cost to the Agency, Directorates shall engage ED to satisfy ground support systems IT requirements. ED shall utilize the MSFC's CIO to provide institutional services as appropriate to satisfy IT requirements.

- It is the responsibility of the MSFC CIO to ensure that Center IT policy and related procedures and guidelines are established, maintained, and consistent with Agency policy and directives. The CIO is responsible for approving waivers and exceptions to this policy.
- The MSFC CIO is responsible for maintaining and implementing IT services at MSFC, as well as NASA-wide programs supported by IT services.
- ED shall be responsible for maintaining and implementing those ground support systems that support all MSFC assigned space flight systems.
- ED shall be responsible for maintaining and implementing space flight software and hardware systems. ED ITMs are responsible for maintaining and implementing the policy in MPD 2800.1, paragraph 7.f.
- Each Directorate and Program/Project Office Director/Manager shall appoint IT representatives to define IT requirements, allocate, and manage IT resources for their organization. ITMs, as the representatives, shall be a primary point of contact with the CIO.



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2) MWI 2800.1 Service Order System for Information Technology (IT) Purchases (effective 07/17/2006)

MWI 2800.1 Service Order System for Information Technology (IT) Purchases describes the steps to be followed by initiators, approving officials, and Office of the Chief Information Officer (CIO) resource analysts in the handling of service orders for Information Technology (IT) purchases for the Outsourcing Desktop Initiative for NASA (ODIN) and Unified NASA Information Technology Services (UNITEs) contracts. The policy for using ODIN and UNITEs is described in MPD 2800.1, and the ODIN and UNITEs services are described in MPR 2800.2.

This MWI applies to all MSFC or NASA employees, including contractors, who order IT purchases through the UNITEs or ODIN contracts. MWI 2800.1 provides instructions for Service Order Initiation, Management Approvals, Funding Approval, Order Delivery, and Restrictions on the Use of the Service Request System for MSFC organizational entities.

3) MPR 2800.2 Marshall Information Technology Services (effective 03/27/2007)

MPR 2800.2 Marshall Information Technology Services establishes responsibilities and requirements for obtaining IT services provided by the MSFC CIO. These services include Desktop Computer Services, Server Systems, LAN Services, IT Support Services, Applications and Web Services, and IT Procurement Services. For other IT services offered by the MSFC CIO, refer to MPD 2800.1, Appendix A, for governing documents. This MPR is applicable to all MSFC organizations, all MSFC support contractors, and other supporting organizations regardless of location.

As defined within MPR 2800.2, the MSFC CIO shall be responsible for:

- Providing IT services to MSFC.
- Establishing and maintaining IT procedures and guidelines that govern provisions of these services as part of MSFC processes.
- Providing IT services consultation and assistance for MSFC users and customers.
- Providing and managing the following Desktop Computer Services in accordance with NASA-STDs-2804 and 2805.

All directors, managers and designated responsible personnel shall be responsible for:

- Reviewing, validating, and projecting MSFC IT Services requirements initiated by personnel within their organizations who require services. Any deviation from standard offerings shall, at a minimum, define at least one of the following:
 - A special requirement that cannot be satisfied by current equipment offerings.
 - A new or enabling technology or capability that is not currently available.
 - A unique adaptation of an existing capability that is not offered.



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- Special considerations regarding accessibility of system capabilities (508 related).
 - Special interface or compatibility requirements with existing systems already in use.
 - A Federally-mandated or NASA-specified compliance requirement that is not met by current equipment.
 - A mission specific requirement that is not otherwise covered by any of the above items.
 - Cost is substantially less than available services provided through UNITes or ODIN.
-
- Notifying and coordinating with organizations' ITMs and the Office of the CIO of all projects requiring or affecting IT services and meetings related to planning of projects.
 - Identifying or providing funding as required for their organization's IT Services.
 - Assisting the Office of the CIO in preparing and maintaining up-to-date records regarding MSFC IT Services for their organization.

4) MPR 2800.4 Marshall Operational Readiness Review (MORR) for Center Applications and Web Sites (effective 06/08/2007)

MPR 2800.4 Marshall Operational Readiness Review for Center Applications and Web Sites establishes requirements to ensure that any computer application or Web site released at MSFC has been reviewed against a set of criteria for operational readiness, including compliance with existing Government, NASA, and MSFC policies and standards.

MPR 2800.4 is applicable to all MSFC organizations, all MSFC support contractors, and other supporting organizations, regardless of location, which develop and/or deliver applications/Web sites for the MSFC community. The MORR process is required before the initial release of a new application or Web site is approved. It is also required when there is a major redesign or addition of functionality to an existing application or Web site that could potentially change the impact to the network, IT Security, user accessibility, user training, or operational support.

NOTE: MPR 2800.4 does not apply to software tightly coupled to flight or ground systems, or a single user application residing on a single computer.

6) MWI 5100.1 Initiating Procurement Requisitions (effective 11/08/2007)

MWI 5100.1 Initiating Procurement Requisitions specifies the PR initiators' responsibilities in the acquisition process from initiation of the procurement package through contract award, receipt of the goods and services, and contract completion. This instruction also provides specific instructions to PR initiators on preparing procurement packages for the acquisition of supplies and services and for other contractual actions.



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7) PIC 07-10

Certain Information Technology -- Except for the Outsourcing Desktop Initiative (ODIN) contract, Government Purchase Cards may not be used for the acquisition of cell phones, Personal Data Assistants (PDAs), pagers, cellular internet services, computer desktops, and workstations without the express written approval from the MSFC CIO. This policy is in accordance with the letter from the Associate Administrator, subject "Mission Focus Review (MFR) Decision Memorandum for Phase 1 Recommendations 7, 100, and 137," dated July 9, 2007. All questions about definitions of these terms will be referred to the MSFC OCIO.

7) *Other Guidance On The Role of The CIO In IT Acquisitions*

NASA CIO, memo dated 05/25/2005, requires CIO approval of investments in:

- Common IT infrastructure
- Desktop support, back-end services
- Document management
- Collaborative tools
- Workflow tools
- Account management or single sign-on capabilities
- Portal technology

NASA CIO Memo, dated 01/31/2006, requires MSFC CIO review and approval of significant changes to IT systems.



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Realignment Required To Meet NPD 1000.3 and SMC IT Strategy

Although the current MSFC governance structure is well suited and aligned with NPD 1000.3 and the SMC IT strategy, there are a number of disconnects between the current IT governance structure at MSFC and the Agency IT governance strategy. In addition, inconsistencies exist in how MSFC organizations execute established MSFC policies and procedures relating to IT management.

In order to fully meet the requirements set forth in Agency policy and strategy, MSFC will need to revise its current IT governance model to more clearly specify the decision rights and accountability frameworks associated with IT strategy, policy, architecture, standards, investment decision planning, IT project management, and IT product and service delivery.

While the role of the CIO in the acquisition process is well-defined in Agency and MSFC policy, a number of inconsistencies exist in how MSFC organizations interpret the defined role of the CIO and in how they procure IT products and services, resulting in duplication of applications and infrastructure services across the Center. MSFC will need to review existing policies and reinforce the need for Center organizations to follow established policy.

The current organizational alignment of skills and capabilities within the Office of the CIO and MSFC mission and mission support organizations presents a series of disconnects and issues in fulfilling the core CIO capabilities and functions as defined in the Agency strategy. The MSFC CIO, in conjunction with Center leadership, will need to reevaluate the current organizational design and staffing strategy for assigned responsibilities and accountabilities and implement a realignment of the workforce and augmentation of skills, capabilities, and competencies in order to fully meet the Agency “Strategy for Improving IT Management at NASA.”

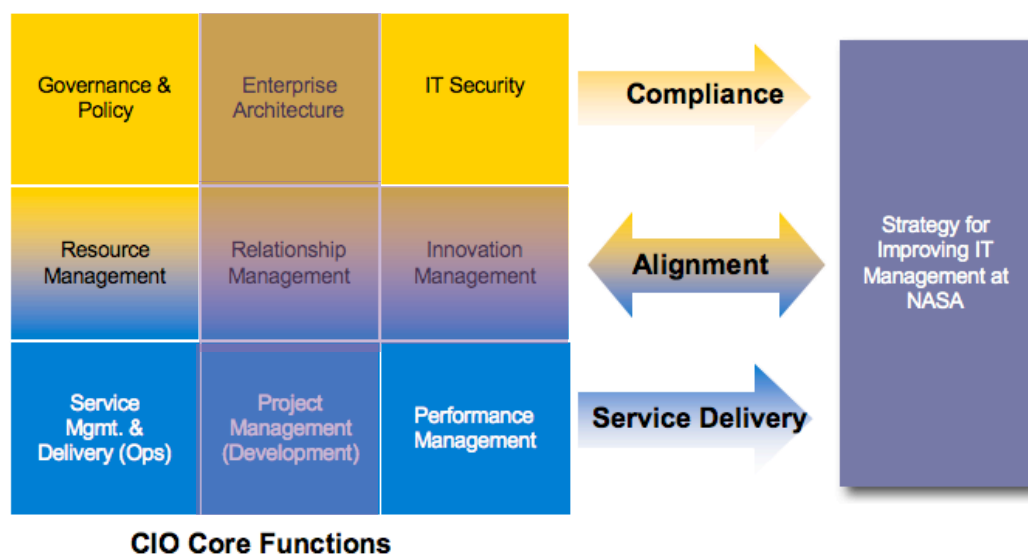


Organizational Alignment With Core CIO Functions

Core Functions Enable Alignment, Service Delivery, and Compliance

The Agency CIO has defined nine core function areas that will be required to fully support the new “Strategy for Improving IT Management at NASA.” These nine core function areas cover not only the skills and competencies of the civil servant and contractor IT workforce, but also the policies, governance structures, and process disciplines that define, shape, and deliver the products and services that are being provided.

The nine core function areas provide the skills and capabilities necessary to ensure *compliance, alignment, and service delivery execution* as shown in Figure 10 below:




 - Relatively new processes within the MSFC CIO organization

Figure 10 - How CIO Core Functions Support The Agency Strategy For IT Management

Three of the core functions - governance and policy, enterprise architecture, and IT security, help ensure compliance with Federal law and Agency policy. Three of the core functions help ensure alignment with Center and Agency mission needs - relationship management, resource management, and innovation management. And three of the functions ensure the ability of the IT organization to execute on product and service delivery - project management (development), service management and delivery (operations), and performance measurement.



Several of the core functions - Governance and Policy, Resource Management, Service Management and Delivery (Operations), IT Security, and Performance Management are considered relatively mature capabilities within a typical CIO's area of responsibility.

For example, IT Security sub-functions are currently accounted for and performed across several CIO offices including IT Security Office (IS10) for IT security policy and compliance, Networks, Telecom, and Desktop Services Office (IS40) for security operations, and Systems Engineering and Operations Office (IS70) for IEMP security operations.

The sub-functions within the Governance and Policy core function are accounted for and performed within the CIO's Policy, Planning, and Integration Office (IS20).

Resource Management sub-functions including Finance, Human Capital Management, Sourcing, and Asset Management are also fully accounted for in the current organizational structure, although significant support for these functions is outsourced to MSFC's Chief Financial Officer, Human Capital, Procurement organizations and supporting contractors (UNITeS and ODIN).

Service Management and Delivery (IT Operations) is accounted for and performed by the Applications, Web and Multimedia Services Office (IS30), Networks, Telecom, and Desktop Services Office (IS40), IEMP Business Process and Applications Support Office (IS60), Systems Engineering and Operations Office (IS70), and IEMP Application Development and Software Assurance Office (IS80).

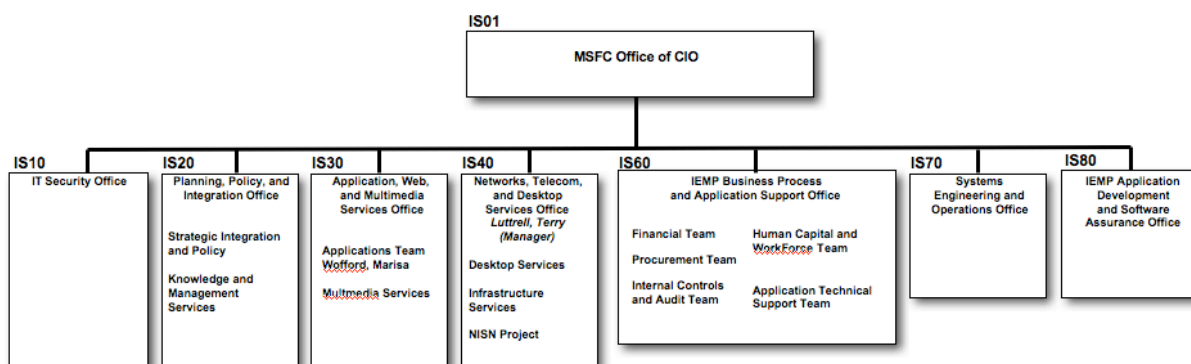


Figure 11 - Current MSFC CIO Organization

The functions associated with Enterprise Architecture, Relationship Management, Innovation Management, and Project Management have only been recently implemented and are still early in their life cycle maturity. The MSFC CIO has taken aggressive steps over the past three years to define and implement a series of transformational frameworks for these core functions. However, due to the limited resources that are available to support these functions, it will take some time before they are fully implemented and the benefits fully realized. In addition, the resources and skills available to support these new functions are limited primarily to that provided through CIO's IT support contractor - UNITeS.



The Center Implementation Team analyzed the core capabilities identified in the Agency strategy and identified several opportunities for improvement. The analysis confirmed that with approximately 22% of the IT workforce currently located outside of the CIO's office, there are disconnects in the organizational design and staffing strategy for how IT services are managed and delivered at MSFC and several of the key core capability areas do not have the right mix of skills and capabilities for execution.

This analysis confirmed the need to conduct a more detailed organizational assessment and develop recommendations to realign the IT workforce to more effectively support the Agency's IT management strategy. The MSFC CIO will need to perform a more comprehensive study to determine overall organizational alignment necessary to bring MSFC IT staffing into full alignment with the Agency strategy.

	Office of the Director (IS01)	IT Security Office (IS10)	Strategic Integration and Policy (IS20)	Knowledge and Management Services (IS30)	Application Services (IS30)	Multimedia Services (IS30)	Desktop Services (IS40)	Infrastructure Services (IS40)	NISN Project (IS40)	IEMP Business Process and Applications Support Office (IS60)	IEMP Systems Engineering & Operations (IS70)	IEMP Application Development & SW Assurance (IS80)	CFO (RS40)	ITM (CS, ED, HS, MP, PS, QD, VP)	OTM (AS, ED, OS, RS)	CSO (AS, CS, ED, HS, IS, JP, MP, PS, QD, RS, VP)	Current Health	Identified Gap
Core Function	CIO Specific																	
Governance & Policy	P																	- Lack of governance structure to support new Agency strategy
Enterprise Architecture		P												S				- Not yet a mature function within the Agency
IT Security		P														S		
Resource Management	P												S					- Skill mix within CIO
Relationship Management			P											S				- Evolving trust of Customer base
Innovation Management			P															- Lack of Collaboration / Portfolio Intergration - No Primary Center responsibility
Service Mgmt & Delivery				P	P	P	P	P							S			- Lacking management of customer expectations - tied to Relationship Management
Project Management			P	P	P	P	P	P	P	P	P	P						- Multiple and inconsistent approaches to Project Management
Performance Management	P																	
CS Assigned - CIO	10	6	6	6	8	7	4	4	9	48	16	6		2	5	2		← Already included in CIO Headcount
CS Assigned - Other	-	-	-	-	-	-	-	-	-	-	-	-	11	8	17	13		Total = 179

P

 Primary Responsibility

S

 Secondary or Support Responsibility

No Identified Gap

Gap Identified

Serious Gap Identified

Figure 12 - Mapping of Core Capabilities Within The MSFC CIO Office

In the interim, the MSFC CIO has developed approaches to address the alignment deficiencies that have been identified within the MSFC CIO and across the Center. These approaches are defined in the sections that follow.



IT Governance Capability/Approach

MSFC's future state approach for IT governance is based on a framework that defines the types of IT decisions that need to be made, who should make these decisions, how decisions will be made, and the roles and responsibilities within the governing structures. MSFC's proposed IT governance model provides a mechanism for addressing these questions and establishing the decision rights and accountability frameworks in the overall context of governance at the Center and within the Agency.

What Types of IT Decisions Need To Be Made

IT decisions are grouped into three broad categories - IT strategy, IT architecture/standards/policies, and IT investments.

- IT strategy decisions include broad discussion and Center agreement relating to overall alignment of IT with the Agency/Center mission, goals, and objectives, as well as clearly articulating the roles and responsibilities of various Center organizations in defining and integrating IT requirements and developing and implementing IT solutions.
- IT architecture, standards, and policy decisions include definition and documentation of policies, technical standards, and the enterprise architecture, including processes for how candidate technology solutions will be evaluated and inserted into the architecture to meet mission needs.
- IT investment decisions include establishing IT investment review and approval authorities, mechanisms for IT investment prioritization, and processes to manage and report the performance of IT projects and operations.

Who Should Make These Decisions

The proposed IT governance structure will provide collaborative forums that engage stake holders and key decision makers to maximize the contribution of IT solutions towards accomplishing Center/Agency goals and objectives in an efficient and consistent manner. MSFC's IT governance process will provide the mechanisms to:

- Actively engage MSFC mission and mission support organizations to identify and document functional information technology requirements.
- Provide a consistent approach to requirements integration, including requirements analysis, business case development, and investment sponsorship and prioritization.
- Provide common methodologies to develop and implement IT solutions, including project management approach, technical requirements analysis, system architecture/design/development, system integration testing, and sustaining operations and support.



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- Establish and leverage well-defined portfolio management processes across the Center to ensure IT investments are made and perform in the most efficient manner possible.
- Document and manage the enterprise architecture to ensure integration and alignment of strategic, business, and technology processes and systems across the enterprise.
- Facilitate project coordination, oversight, and performance reporting, operation and configuration control of systems and services, and high-level discussion and review of mission and mission support needs, strategy, policies, investment decisions and project performance.

How IT Decisions Will Be Made

In order to address the wide range of decisions which normally occur throughout the life cycle of an IT investment, MSFC will be required to establish a more formalized, structured approach that clearly identifies responsibilities and interfaces between governing authorities.

The current three-tier model used throughout the Agency and the Center is well suited to provide complete life cycle coverage of an IT investment from requirements discovery, to investment prioritization, to implementation/operations, to investment performance assessment and finally retirement/decommissioning.

Figure 13 shown below outlines how MSFC proposes to address IT Governance at the Center. This approach will require the establishment of new decision support bodies to facilitate how IT decisions will be made at the Center, including:

- Implementation of a Center IT Strategy and Investment Board (ITSIB) to review and approve IT strategy, policy, architecture, and investment decisions.
- Formalization of an MSFC Enterprise Architecture Advisory Committee (MEAAC) to define and manage the mission and mission support architectures.
- Implementation of expanded relationship management and architecture roles to ensure IT requirements identification, integration, and development/implementation.
- Implementation of formalized processes and capabilities for IT project management and operations functions within the MSFC CIO.
- Application of Agency-defined IT portfolio management processes for investment planning, review, prioritization, and approval.
- Rigorous application of funding and investment controls for costing and charge-back, budget formulation and actuals tracking, benefits realization, and control and coordination.

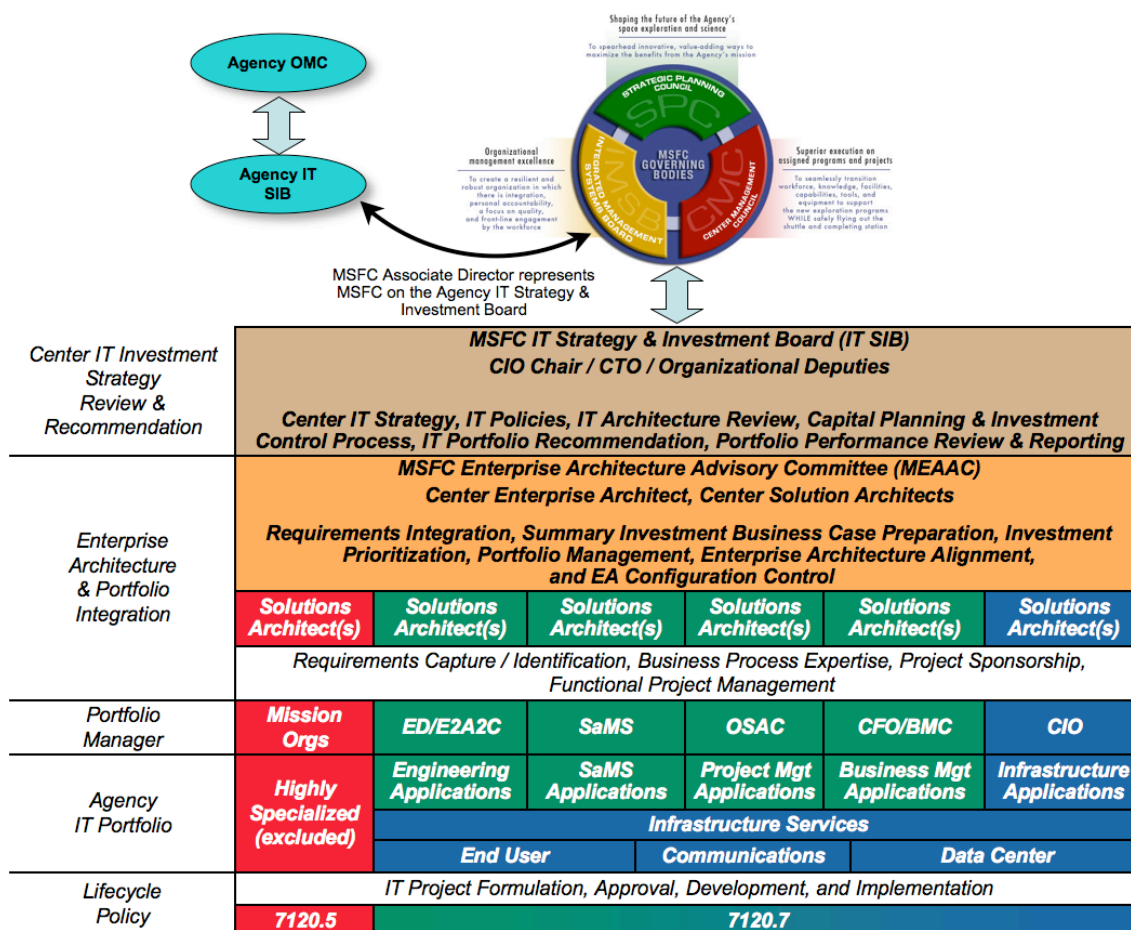


Figure 13 - MSFC IT Governance Structure (conceptual - high level)

Roles and Responsibilities Within MSFC's Proposed IT Governance Structure

MSFC IT Strategy and Investment Board (MSFC IT SIB)

MSFC will implement an IT governance structure that is fully aligned with the existing Center governance structure and tightly coupled to the Agency's new strategy for IT management. MSFC will formalize an IT Strategy and Investment Board - a subcommittee to the MSFC IMSB to review, discuss, and make recommendations to the Center/Agency with regard to IT strategy, policy, architecture, portfolio investment planning, and portfolio performance management.



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The MSFC IT SIB will provide a Center-level forum to discuss information technology strategy, IT architecture, investment prioritization and selection recommendation when visibility, integration, and understanding are needed to drive alignment to Center and Agency goals and objectives; ensuring implementation of NASA IT policies and processes; and monitoring IT portfolio performance. This board will complement the Agency IT SIB, will report to the MSFC IMSB and provide down and out guidance to MSFC organizations. ***A draft charter for the MSFC IT SIB is included in the appendix.***

MSFC Enterprise Architecture Advisory Committee (MEAAC)

MSFC will also implement an MSFC Enterprise Architecture Advisory Committee (MEAAC) to provide a Center-wide approach to IT requirements integration, IT investment business case preparation, enterprise architecture alignment, portfolio management, and configuration control. The MEAAC will develop and ensure integration of IT requirements, prepare summary investment business cases, and prioritize and recommend IT investments for approval to the IT SIB. The MEAAC will direct, oversee, and approve design and operating configurations that affect MSFC IT investments in the various IT investment portfolios; and review, approve, and control changes to the baseline configuration of the MSFC Enterprise Architecture. ***A draft charter for the MEAAC is included in the appendix.***

The MEAAC is established to accomplishing the following goals:

- Ensure integration, value, and security of information and the tools that are used in the creation, discovery, analysis, and dissemination of data.
- Make fiscally-responsible investment decisions by eliminating functional redundancies in information systems within the MSFC enterprise architecture.
- Recommend prioritization of IT investments in the IT applications and Infrastructure Services portfolios.
- Ensure that MSFC mission and mission support organizations fulfill their responsibilities for mission success with the same disciplined and rigorous approach to information systems design and management as it applies to flight systems design and management.

The MEAAC will be comprised of a team of IT Solutions Architects who are responsible for overseeing the planning, design, development, and implementation of the enterprise architecture segments and for ensuring the development and documentation of standards, policies, and principles to support the integration of mission critical business, application, information, and technology architectures within each of the IT portfolio segments at MSFC. ***A draft description of the roles and responsibilities of the Solutions Architect is included in the appendix.***

MSFC CIO IT Project Management and Operations Functions

To ensure alignment with the Agency strategy to manage IT investments through well-defined portfolios, the MSFC CIO will formalize functions within its organization to improve IT project formulation, project management coordination and



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oversight, and investment performance reporting. In addition, the MSFC CIO will formalize an internal IT operations function to review and manage Center IT operational systems and configuration/change control board oversight, portfolio performance oversight, and IT community of interest coordination.

Within the MSFC CIO, the IT project management function will provide infrastructure applications and services project portfolio tracking and reporting to the MSFC IT SIB, implement standard processes for management and execution of approved CIO-managed initiatives and projects, and provide coordination of IT project management activities, processes, and resources for major IT steady-state and development/modernization/enhancement (DME) initiatives/projects.

The IT operations function will serve as a configuration control function for Center IT infrastructure and applications initiatives, reviewing and approving high-level infrastructure and applications requirements within the IT Applications and IT Infrastructure Services portfolios. It will also maintain visibility into other IT applications portfolios (Engineering, Science and Mission Systems, Project Management, and Business Management applications) to ensure that the requirements for supporting IT infrastructure services are available and are meeting performance expectations.

A Governance Structure That Maximizes Stake Holder Participation and Decision Making

MSFC mission and mission support organizations will have overall responsibility for the engineering applications portfolio, science and mission systems applications portfolio, project management applications portfolio, and business management applications portfolio. The CIO organization will have responsibility for the IT infrastructure applications and IT infrastructure services (end-user, communications, and data center) portfolios. In addition, the CIO will have overarching responsibility for ensuring alignment of those applications with the NASA enterprise architecture and for all aspects of the IT Infrastructure in which those applications reside. This approach is consistent with the Agency strategy.

MSFC's proposed IT governance structure will ensure that key stake-holders and decision makers are engaged to maximize the contribution of IT solutions towards accomplishing Center goals and objectives and will deliver architecturally-compliant and insertion-ready technologies that are traded against other candidate options in a business case environment for inclusion within the enterprise architecture.

Summary of Roles and Responsibilities Within The Proposed MSFC IT Governance Structure

Table 2 below provides additional detail on membership, scope, inputs/outputs and meeting frequency of each of the MSFC IT governance entities.



	MSFC IT Strategy and Investment Board (IT SIB)	MSFC Enterprise Architecture Advisory Committee (MEAAC)
Meeting Frequency	Quarterly	Monthly
Membership	<ul style="list-style-type: none"> • Office of the Chief Information Officer (Chair) • MSFC Assistant Director for Technology & Chief Technologist (currently vacant) • Office of Strategic Analysis and Communications - Deputy • Office of Center Operations – Deputy • Office of the Chief Financial Officer – Deputy • Office of Human Capital – Deputy • Engineering Directorate – Deputy • Exploration Launch Office – Deputy • Office of Chief Counsel – Deputy • Shuttle Propulsion Office – Deputy • Office of Diversity and Equal Opportunity – Deputy • Office of Procurement – Deputy • Safety and Mission Assurance Directorate – Deputy • Science and Mission Systems Directorate – Deputy • Secretariat 	<ul style="list-style-type: none"> • MSFC Chief Enterprise Architect (initial chair) • Engineering Applications Portfolio Solutions Architect • Science and Mission Systems Applications Solutions Architect • Business Management Applications Solutions Architect • Project Management Applications Solutions Architect • Infrastructure Applications Solutions Architect • Infrastructure Services Solutions Architect • Secretariat
Scope	<ul style="list-style-type: none"> • Center IT Investments • Strategic Institutional Investments (SII), Over-guides, Center Management and Operations (CMO), and Corporate • Center Enterprise Architecture • Center IT Strategy, Policy and cross-cutting processes 	<ul style="list-style-type: none"> • Direction and oversight of mission / mission support architecture activities • NASA/MSFC enterprise architecture management policies • Operational conflict resolution
Decision Basis	<ul style="list-style-type: none"> • Made by the Chair on the basis of data and discussion • Escalation path to the Center Director/Agency SIB can be invoked if necessary 	<ul style="list-style-type: none"> • Decisions/recommendations made by the Chair on the basis of data and discussion of members • Chair rotates every 6 months between MSFC Chief Enterprise Architect, Engineering Applications Portfolio Solutions Architect, Science Applications Portfolio Solutions Architect, Project Management Applications Solutions Architect, Business Management Applications Solutions Architect, and IT Infrastructure Solutions Architect • Escalation path to the MSFC IT SIB can be invoked if necessary



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	MSFC IT Strategy and Investment Board (IT SIB)	MSFC Enterprise Architecture Advisory Committee (MEAAC)
Activities	<ul style="list-style-type: none"> • IT Strategy Approval • IT Policy Approval • EA Approval • Investment Selection • Investment Performance Review 	<ul style="list-style-type: none"> • Architecture principles • Architecture roadmap • Policy review • System functional requirements • Configuration change review • Investment prioritization and recommendation
Inputs	<ul style="list-style-type: none"> • Policy & Strategy Documents • EA As-Is & To-Be Documents • IT Investment Proposals • IT Portfolio Performance Analysis • IT Project Reviews 	<ul style="list-style-type: none"> • IT Strategy and policy • Architecture policy • Summary Investment business case for IT investments • Operating requirements • Configuration change requests
Outputs	<ul style="list-style-type: none"> • IT Strategy • Investment Decisions • Investment KDP Approvals • Portfolio Approvals • Enterprise Architecture Approvals 	<ul style="list-style-type: none"> • Enterprise Architecture roadmaps • Enterprise Architecture policy documents • Investment scoring and alignment processes & documentation • IT Portfolio prioritization for submittal to Agency IT SIB • IT Portfolio performance analysis & review
Duration of Appointment	<ul style="list-style-type: none"> • Members shall serve until appointments are rescinded by memorandum of membership from the IMSB Chair 	<ul style="list-style-type: none"> • Members shall serve until their appointment as Solutions Architect is rescinded

Table 2 - Roles and Responsibilities of MSFC IT Governance Entities



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Enterprise Architecture Capability/Approach

The MSFC Chief Enterprise Architect (CEA) coordinates Agency policy, guidance, and direction, and ensures Center knowledge, understanding, and application of policy and requirements as set forth in NPD 2830.1 NASA Enterprise Architecture (EA) and NPR 2830.1 NASA Enterprise Architecture Procedures.

The MSFC CEA is certified by the FEAC Institute. Under the leadership of the MSFC Chief Enterprise Architect, EA support is provided via the UNITEs contract to MSFC mission organizations to:

- Define the financial and workforce planning architectures at MSFC.
- Develop the data and configuration management architectures for the Ares Project Office and define the engineering segment architecture.
- Coordinate and support enterprise architecture reviews of major IT projects and activities per NPR 7120.5 and NPR 7120.7.

The CEA translates business vision and strategy into mission-enabling change by establishing the frameworks, processes, standards, and relationships that effectively align IT assets, people, technologies, and solutions of the enterprise. Also, the CEA is responsible for coordinating enterprise architecture activities and initiatives with IT Solutions Architects and IT Solutions Specialists within the relationship management function.

The MSFC CIO has formalized the EA function within the CIO Policy, Planning and Integration Office (IS20). The MSFC Chief Enterprise Architect is responsible for:

- Development of the Enterprise Architecture.
- Integration of the Enterprise Architecture and IT Portfolio Management.
- Integration of the Enterprise Architecture and IT Strategic Planning.
- Management of Enterprise Architecture Use.

To do this, the CEA oversees the planning, design, development, and implementation of the Center enterprise architecture and the development and documentation of standards, policies, and principles that support the integration of mission-critical business, application, information, and technology architectures. The CEA also establishes a Center-wide information technology architecture vision and develops processes and standards used for defining information technologies, products and services that may be used within the enterprise.

Development of the Enterprise Architecture

The CEA manages the collection of baseline information on MSFC business activities, data, and supporting applications and technology. As input to the EA, this information is extensively analyzed to identify opportunities for streamlining, collaboration, and consolidation. The completion of this activity entails the modeling and documentation of a broad collection of work products and relationships which describe the current business and IT environment across the MSFC.

The Center-wide target EA formalizes the definition of a vision of where the MSFC wants to be in order to appropriately carry its assigned mission and mission support activities. The target EA brings together and normalizes disparate elements of this vision and translates higher level aspirations into more tangible Enterprise Architecture elements, such as specific services and technologies that are needed to support the business.



The target EA also focuses on those aspects of the architecture that will be addressed collaboratively at the enterprise level and impact multiple organizations. As with the “as-is” architecture, the development of the “to-be” architecture entails the modeling and documentation of a broad collection of artifacts and relationships that describe the desired future business and IT environment across MSFC.

Integration of the Enterprise Architecture and IT Portfolio Management

The MSFC EA methodology is centered on conducting detailed architecture efforts around specific, prioritized architectural “segments.” A segment architecture is a detailed architecture or “deep dive” for a portion of the overall MSFC EA, where measurable results (performance improvement, cost reduction) can be achieved through implementation of an improved future-state.

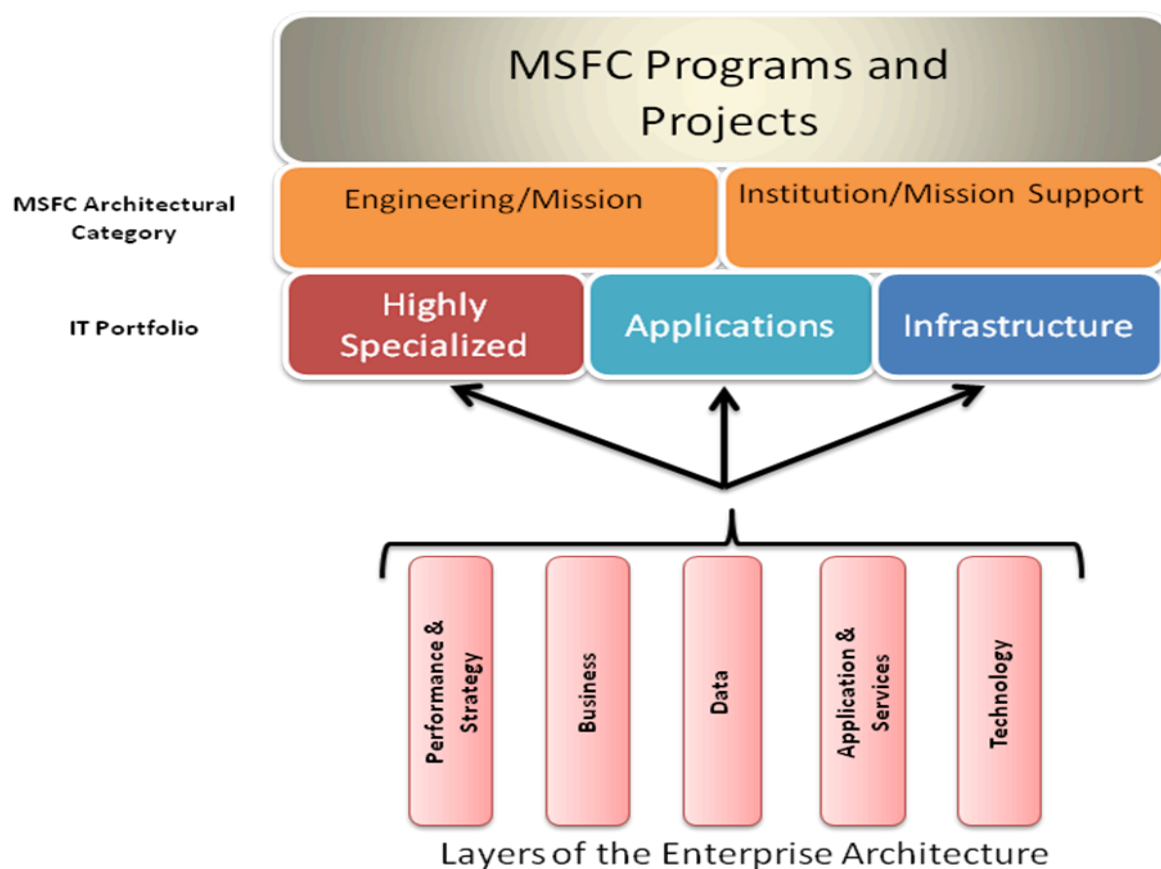


Figure 14 - MSFC Enterprise Architecture Segments



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Segment architectures are centered upon the IT Portfolios as defined by the CIO and managed by the MSFC CIO. Each segment-architecture addresses all architectural layers, from strategy to technology. This allows for the documentation of the business requirements and processes that drive the technology assets managed in the different IT Portfolios. Integrating Enterprise Architecture documentation with the active governance and management of IT Portfolios ensures that technology decision-making aligns with business priorities.

Through describing the work of the MSFC in component pieces, segment architectures provide a clearer understanding of how a particular organization, or the performance of a particular business function, can be structured to more effectively achieve mission goals and objectives. By identifying appropriate metrics and accurately measuring the impacts of architectural efforts on business operations, organizations, and the MSFC as a whole, the EA is able to realize, and inform stake holders of, the benefits of segment architectures.

Integration of the Enterprise Architecture and IT Strategic Planning

The maintenance of all major EA artifacts is ongoing and iterative. The Baseline (“as-is”), Target (“to-be”) and EA transition plans are all living sets of artifacts that evolve as MSFC EA efforts mature. The alignment between business objectives and technology initiatives documented in the EA drives the development of IT strategic plans.

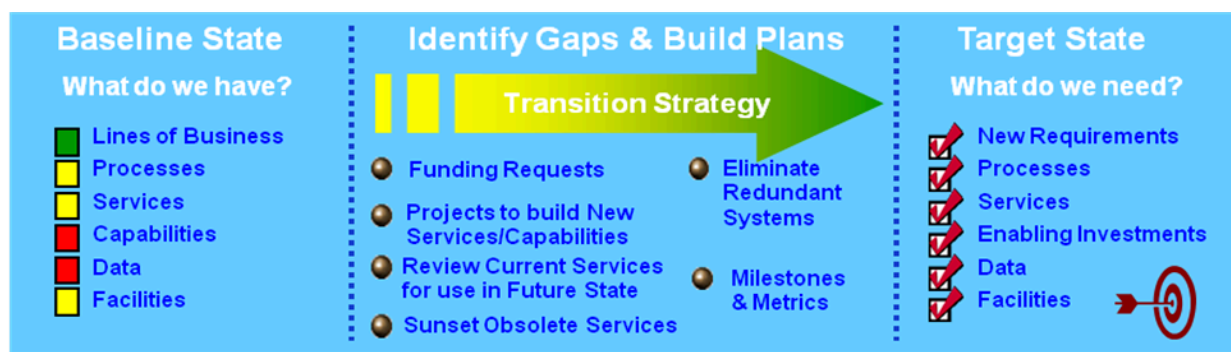


Figure 15 - MSFC Enterprise Architecture Activities (conceptual)

The Agency CIO IT Strategic Plan describes the IT objectives that support NASA mission objectives. Strategic IT objectives are realized through IT investment. Reviewing the alignment of the IT portfolios with the Target EA and EA Transition Plans on a regular basis provides an opportunity to ensure that the architecture drives investment. Alignment review also provides a mechanism to further assess business needs and investments, which in turn may drive changes to the EA.

Management of Enterprise Architecture Use

Because many of the MSFC's existing IT initiatives are already moving the different organizations toward a “to be” environment, Enterprise Architecture transition planning helps to organize these initiatives in a more holistic framework, so that potential opportunities for collaboration, consolidation, and sharing across previously independent initiatives can be managed at the enterprise level. Likewise, transition plans identify complementary sets of new transition activities to further advance modernization. EA transition plans are developed through a logical sequence of steps focused on identifying, prioritizing, and sequencing transition activities that will be necessary to achieve target EA states.



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In addition to transition activities, there are several considerations involved with ensuring compliance with the Enterprise Architecture:

- EA-driven Investment – The Target Enterprise Architecture and Enterprise Architecture Transition Plan form the basis for IT investment. As segment architectures are developed, more detailed implementation plans will identify specific investments.
- Collaborative EA Development and Governance – Because both EA and segment architectures are being developed through a highly-collaborative process, with all stake holders having a voice in the outcomes, stake holders will be more inclined to comply with the EA that they helped develop.
- EA-Capital Planning and Investment Control (CPIC) Integration – EA considerations play an important role throughout the CPIC phases of Pre-Select, Select, Control, and Evaluate. During Pre-Select, the Target EA and EA Transition Plan serve as inputs to a comprehensive Investment Portfolio Review, during which all investments are reviewed for compliance with the EA and given guidance to help project managers better align with the EA. During Select, a number of EA factors are considered in the actual evaluation of initiatives, resulting in the promotion of greater alignment within the IT portfolio.

EA use involves the implementation of IT standards that guide future solution development and operational support activities. Establishing IT standards decreases the number of platforms that need to be managed, reduces risk and increases the effectiveness of shared services. IT standards allow for the consolidation of hardware and software products performing similar functions. Effectively using IT standards will allow the MSFC to begin to move away from local silo views of applications and data towards an enterprise view.

EA helps establish the technical and architecture standards that will guide future solution development and operational support activities. EA also documents the technologies that are acceptable for the current and future environment and even facilitate IT configuration control to specify the software, hardware, and protocols acceptable within the current environments. Other activities include facilitating the architecture review boards, developing and implementing architecture metrics and communications, and developing EA artifacts and guidelines.

Applying Enterprise Architecture as a Discipline

Through the EA discipline, the MSFC CIO organization will provide consistent, quality services, align technology with mission requirements, and ensure compliance with policy across MSFC. The required capabilities include the competencies of employees (civil servants and contractors) and the policies, governance structures, and process disciplines that guide and deliver the services for meaningful, ongoing communication between IT and the MSFC mission organizations.

EA will be used to translate the business vision and strategy into effective enterprise change by creating, communicating, and improving the key principles and models that describe the enterprise's future state, and enables its evolution.

As EA provides the detailed analysis to identify and enable the required strategic change, it assists in defining how the MSFC CIO and IT are aligned with business objectives and, as such, sets the overall direction for the MSFC mission organizations. EA helps to further define IT strategic planning by defining the methodology used to align business objectives with IT projects and technology initiatives. This develops the CIO's strategic plan and sets priorities for the next 3-5 years. MSFC's performance is then measured against the goals established in the strategic plan.

EA establishes the architecture that provides a comprehensive framework, relationships and standards used to align and manage the IT assets, people, technologies and solutions to support the business operations while providing services and benefits to the business. This leads to a structured approach used to categorize, evaluate, and prioritize the



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organization's technology assets (physical hardware, infrastructure and application software and skills). With such an approach, EA can support the management of IT application portfolios by ensuring technology decisions align with business priorities. EA continuously evaluates the technology portfolio to determine the business value and makes recommendations for new development, replacement, and sun-setting of applications.



IT Security Capability/Approach

When the “Strategy for Improving IT Management at NASA” was published, the MSFC IT Security Office was already engaged in a mission area analysis of the IT security function. The intention was to determine what functions the security core capability is performing, determine what functions the security core capability should be performing, produce a gap analysis, and move to correct any deficiencies identified. The approach that had already been started was mission focused and completely supportive of the approach outlined in “Strategy for Improving IT Management at NASA.” The approach to that mission area analysis already underway is depicted and described in Figure 16 below.

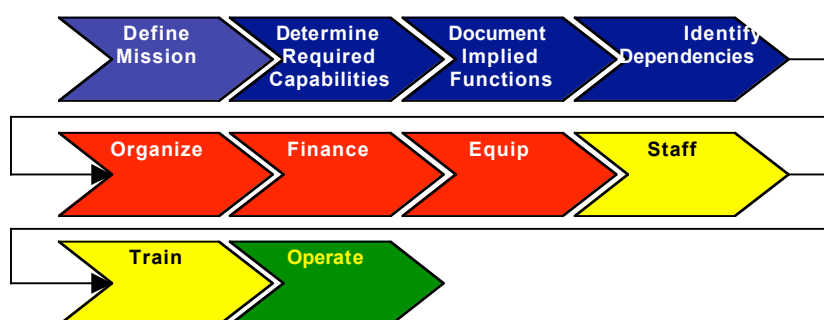


Figure 16 - Mission Area Analysis of IT Security Function

First, the IT Security Manager (ITSM) defines the mission of the security core capability. This includes identifying the constituency to be served and the nature of the ITSM’s authority relevant to the constituency. Next he determines the capabilities that he must have in order to accomplish that mission. Having documented the required operational capabilities, he lists the functions that are implied in each of those capabilities. For example, in the case of the incident response required capability, one of the functions might be disk imaging; another might be image analysis; etc. Then he identifies any dependencies that may be implicit in the functions. For example, in the case of the vulnerability mitigation required capability one implicit dependency is the presence of a configuration management capability elsewhere in the Center (to control the process of enterprise patching).

At this point the ITSM has enough information to begin determining the best way to staff the capability area given all the functions that must be performed. He then enumerates and weighs available options for how go about financing the cost of establishing and maintaining the capabilities required to fulfill the mission. At this point he identifies the equipment that will be required to support the mission overall. He then staffs to build the organizational structure that he has designed. Under the present governance structure this staffing would have been executed in part by the MSFC ITSM and in part by the security managers of the various staffs supporting Agency projects at MSFC. Once the staff is on



board, he trains them, and once that is complete he declares that he has an operational capability and the staff goes to work.

This mission area analysis is on-going, and other areas included in this analysis include, but are by no means limited to:

<ul style="list-style-type: none"> • Incident response • System development life cycle • Security training • Security governance • Security policy • Password cracking • Change detection • Intrusion prevention • IDS/IPS • Firewalls 	<ul style="list-style-type: none"> • Enterprise Audit • Access Control • OS Hardening • Secure System Integration • Access Control • Configuration Management • Software Assurance • Code Review • Product Evaluation • Database Security 	<ul style="list-style-type: none"> • Data Tagging/Attribute based access control • Certification and Accreditation • Internal Controls • Privacy • Privacy Act • Privacy impact assessments/controls • COOP/DR • Access control
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Table 3 - MSFC IT Security Functions and Responsibilities

A partial list of one of the functional requirements and dependencies associated with just one of these required operational capabilities already yielded by that process includes the information in the following table.

Required Capability: Mitigate vulnerabilities in the Marshall computing environment	
Functional Requirement	Dependencies
Identify all security vulnerabilities present in the MSFC computing environment	Access to all IT assets
	Knowledge of OS and applications present
	Vulnerability scanners capable of identifying vulnerabilities in all of the above
	Ability to validate scanner findings (requires administrator access to scanned systems)
Assess risk associated with each vulnerability	Put an effective risk ranking system in place such as one compliant with NIST IR 7435 (CVSS)
Mitigate risk – Case a: technical flaw in code	Configuration management system
	Ability to test work-around or patch
	Ability to push code or otherwise affect workaround
	Work prioritization scheme



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Mitigate risk – Case b: Mis-configuration of host or device	Ability to develop a solution
	Ability to test a work around or solution
	Ability to deploy a work-around or solution
	Work prioritization scheme
	Ability to audit that the solution or work-around was completed
	Build documents
Mitigate risk – Case c: User behavior	Ability to train behavior
	Acceptable use policy
	Ability to detect change
Authority to direct mitigation efforts	Delegation of authority
Verify that a vulnerability has been mitigated	Admin access to all hosts and network devices
Ability to incorporate vulnerability assessment into a risk score that includes an assessment of the threat and the potential loss as well.	CVSS compliant risk ranking system

Table 4 - Alignment of Requirements/Dependencies Within IT Security (Partial)

The next step in this model is to organize, finance, equip, staff, train, and operate. These are not accomplished until all required operational capabilities throughout the entire mission area have been identified as well as all dependencies. It is at this point, however, that the “Strategy for Improving IT Management at NASA” has become available. The core capability model contained in “Strategy for Improving IT Management at NASA” depicts nine core capability areas, one of which is labeled “IT Security” as depicted in the exhibit below. Many of the functions traditionally accomplished by the MSFC ITSM are included within the document’s description of the security management core capability area. However, other security functions traditionally accomplished by the MSFC ITSM are described as belonging to the Service Management and Delivery core capability area, an area not traditionally associated with the MSFC ITSM. For example security planning and management, security architecture, security compliance, and COOP/DR are all under the Security Management core area, whereas security operations is under the Service Management and Delivery core area.

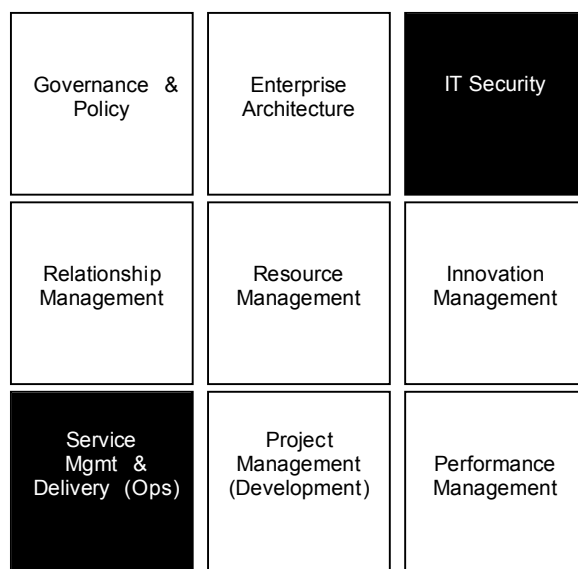


Figure 17 - IT Security Core Capabilities

A more detailed breakout of the security capability requirements and the way they are distributed between the core competency areas in the “Strategy for Improving IT Management at NASA” is shown in the following table.

Security Management Core Competency Area	
Security Planning and Management	Ensures information system security across the enterprise
	Develops and maintains information security programs
	Develops a framework for organizing consistent security policy, identifies appropriate list of security controls for implementation and develops metrics to gauge the effectiveness, efficiency, and value of the security program
	Develops privacy management procedures
	Coordinates the design and implementation of processes and practices that assess and quantify risk
Security Architecture	Develops security architecture vision, strategy, principles, standards and reference architectures
	Performs multi-year security planning and project management and planning
Security Compliance	Implements the enterprise information security and risk management program, including identification of appropriate control mechanisms and corresponding compliance activities to address specific regulatory or NASA requirements
	Performs audits to assess development projects and service organizations compliance with security and privacy policies and procedures



COOP/DR	Establishes the plan and requirements for the recovery and subsequent operation of the IT environment and corresponding services after a natural or man-made disaster
	Ensures that the required IT technical and services facilities can be recovered in accordance with agreed service levels
	Activities include identifying roles and responsibilities for the process, educating associates of the process, developing IT recovery plans, and supporting the regular review and testing of the plans
	Coordinates with infrastructure and operations staff that will execute the COOP/DR plans
Service Management and Delivery Core Competency Area	
Security Operations	Supports the ongoing process of protecting the information and systems from unauthorized access, use, disclosure, destruction, modification, or disruption
	Implements the various security policies and procedures as defined by the Security Management Group. This includes antivirus and content control, authentication and authorization, identity life cycle, encryption and platform security activities to protect the organizations' information

Table 5 - IT Security Management Core Competency

The MSFC ITSM is now incorporating all of core security areas contained in “Strategy for Improving IT Management at NASA” into its own mission area analysis to determine how to best organize to provide these capabilities across the Center. The MSFC ITSM understands that the existence of separate blocks in the capability area diagram does not necessarily imply separate blocks on our organizational chart. It may be that these functions will reside in separate entities within MSFC OCIO, or it may be that all MSFC Security functions are consolidated under one organizational security entity at MSFC. This is being weighed as all groups within OCIO now undergo their own mission area analyses simultaneously. This also implies that added to the process described above is the need for collaboration between CIO entities at MSFC, particularly during the “Organize” step described above.

The MSFC ITSM will incorporate the above, complying with the schedule established for compliance with “Strategy for Improving IT Management at NASA”. Looking forward it is likely that the ITSM constituency will continue to be confined to systems hosted and/or managed at MSFC. The required operational capabilities grouped under the MSFC ITSM, however will include all those security-related functions described in Section 5.5 “Strategy for Improving IT Management at NASA” including the Center Privacy responsibilities (i.e., MSFC Privacy Act Manager) and some Continuity of Operations (COOP) and Disaster Recovery (DR) responsibilities. Additionally, all Center personnel that currently perform any of the Center CIO functions outlined in the Strategy will be hard-line transferred to align with the transition of prioritized services. However, it is expected that the Organization Computer Security Officials (OCSO) will remain in the MSFC organization they represent and continue to function as they do today.

The Information System Change Board (ISCB) will continue to disposition security issues associated with all information technology systems hosted and/or managed by MSFC. The mission of the ISCB is to assure, through appropriate review and concurrence processes, a level of risk relative to security and integrity of MSFC hosted and/or managed IT resources which meet or exceed Agency and Center requirements, while maintaining an IT environment which fully



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supports the Agency and Center missions. The primary policy document for NASA IT Security is NPR 2810.1a, Security of Information Technology. Agency and Center policies, standards and procedures will be used to formulate a set of Agency metrics that will form the basis for measuring success of the IT Security program both Agency-wide and at MSFC. These metrics will become a major part of the Agency's Federal Information Security Management Act (FISMA) annual report for which data is collected quarterly.



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Resource Management Capability/Approach

The resource management capability includes four distinct sub-functions - finance, human capital management, sourcing, and asset management.

Finance

Description of the function: Develops and implements the financial services for IT planning and control. Coordinates all charge-back / cost recovery activities for CIO-provided services. Activities include developing budget proposals, planning IT spending allocation, enhancing business case development and financial modeling and cost accounting, and billing for services.

How the function is currently provided: MSFC CIO organization has two business managers (civil service) supporting MSFC IT services and the Integrated Enterprise Management Program (IEMP). The MSFC CFO organization provides finance and accounting services to the MSFC CIO. Six civil servants and five Digital Fusion contractors provide the listed financial services.

Go-forward actions to improve IT procurement visibility include:

- An analysis of current IT procurements at the Center identified a potential issue with the tracking of IT procurements. Approximately \$303M, or approximately 10.45% of total procurements were identified as IT procurements within the SAP system. However, some IT procurements are initiated outside of the normal PR process through the use of bank cards and support contractor procurements.
- Recommended go-forward actions to improve the visibility into the entire MSFC IT budget and provide improved IT investment decision making include:
 - Vesting the IT Strategy and Investment Board with the responsibility and authority for evaluating, prioritizing, selecting, and recommending to the MSFC IMSB potential IT investments that exceed \$100K for IT purchases.
 - Having the MSFC CFO complete and assessment and develop recommendations for improving IT procurement initiation processes and controls, working through the MSFC Business Management Committee to ensure that only trained and knowledgeable users generate transactional data in the Agency's SAP system, and strengthening user support and management control processes for IT requisitions - PRs, bank card, and support contractor purchases.
 - Ensuring that Summary Investment Business Cases are developed for each IT application and infrastructure investment to support the investment prioritization, recommendation, and decision process.

Human Capital Management

Description of the function: Oversees all activities having to do with workforce management. Understands the current organization's staffing levels and skill sets. Defines and develops the roles, responsibilities, skills and competencies necessary to support the IS strategic changes, objectives and investments. Manages professional development and training activities, including coordinating with National Foreign Affairs Training Center (NFATC) to develop IT training curriculum. Analyzes, develops, and maintains NASA resource policies, regulations and procedures.



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How the function is currently provided: The MSFC CIO organization has a dedicated administrative officer (civil servant) that supports the MSFC CIO management team and coordinates and provides human capital management services to the organization. The MSFC Office of Human Capital also provides a dedicated human capital representative to assist the MSFC CIO organization to ensure the right complement of staffing levels and skill sets, and communicate changes in human capital policies, regulations, and procedures.

Sourcing

Description of the function: Develops the sourcing strategy. Selects vendors and builds an appropriate portfolio of internal and external people and service providers. Manages relationships between IT and its service providers ensuring alignment and effective collaboration. Manages contract life cycle and measures and manages vendor performance. Ensures the delivery of the specified outcomes is obtained in terms of performance commitments.

How the function is currently provided: The MSFC CIO manages two large IT support contracts on behalf of the Center - the Unified NASA Information Technology Services (UNITeS) contract and the Outsourcing Desktop Initiative for NASA (ODIN). The MSFC CIO utilizes a group of Technical Monitors (TM's) to monitor the technical performance of the UNITeS and ODIN contracts and provide input to and supports the Contracting Officer's Technical Representative (COTR) and Delivery Order Contracting Officer's Technical Representative for assessing the overall delivery performance of the contractor. Contract sourcing strategies are coordinated with NASA Headquarters and Center Procurement Officials in accordance with established procedure and guidelines.

Asset Management

Description of the function: Manages and optimizes the cost, retention and ultimate disposal of IT assets (hardware and software). Ensures IT assets are identified, properly categorized and that plans are established to manage the full asset life-cycle. Manages the licensing associated with all IT assets, leveraging enterprise-licensing economies of scale. Coordinates with Technology Refresh during the identification of assets and in the scheduling of life-cycle replacements, upgrades, etc.

How the function is currently provided: The MSFC CIO provides IT asset management services through the two major support contractors - UNITeS and ODIN. MSFC CIO Business Managers coordinate and leverage enterprise software licensing across the Center to ensure economies of scale. The ODIN contractor provides regular technology refresh of desktops and mobile devices as part of the standard ODIN product offering.

Workforce Challenges Presented By The New IT Management Core Functions

The Agency SMC approved a recommendation to re-organize the IT workforce to align with the nine core functional areas shown in Figure 3 above (Governance and Policy, Enterprise Architecture, IT Security, Resource Management, Relationship Management, Innovation Management, IT Service Management and Delivery, Project Management, and Performance Management). The SMC approved two fundamental changes to alignment of the IT workforce:



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- Civil servants who are primarily involved in IT infrastructure service delivery (including oversight of contractors who deliver IT infrastructure services) should be assigned to the Center CIO organization.
- Relationship Manager and Architect roles should be implemented in the Center CIO organizations to act as the primary interface between NASA customers and CIO organizations.

Of the nine core function areas identified in the Agency strategy, four of the core function areas - Enterprise Architecture, Relationship Management, Innovation Management, and Project Management - are considered to be relatively new function areas, requiring specialized skills and competencies that are not widely available within the organization or at the Center.

CIO IT Competency Assessment

In November 2006, the MSFC CIO completed an assessment of leading IT organizations to identify the skills and competencies these best-practice organizations possessed. This assessment yielded 25 IT-related competencies that these leading firms were focusing on establishing and building in their organizations.

The MSFC CIO leadership team (comprised of senior civil service and contractor managers) reviewed and scored the 25 IT competencies in terms of the overall *importance of each competency to enabling Agency mission success* versus the *overall performance of the CIO organization* (i.e., how we should be performing vs. how we were performing as an organization) for each of the best-practice competency areas. The 25-best practice competency areas were then ranked based on the *gap between mission importance and organizational performance*.

The CIO leadership team identified focus bands for near-term, mid-term, and long-term to be able to address and target specific IT competency areas for improvement as shown in Figure 18.

The MSFC CIO also conducted an assessment of the best-practice competency areas against data currently provided in the NASA Competency Management System (CMS) and found that CMS provided limited capability to track IT-specific best-practice competencies.

A multi-tier cross walk (shown in Figure 19) was established to map the 25 best-practice competencies to CMS-specific competencies. For example, the "Strategy and Planning" best-practice competency was mapped to CMS competencies - Business IT Architecture (BITARCH), Business IT Planning (BITPLAN), and Business IT Systems (BITSYS).

Once the cross-walk mapping was completed, the MSFC CIO could then more accurately assess the overall state of competencies within its organization. In addition, it provided added full visibility into the entire MSFC workforce to identify individuals that might possess one or more of the best-practice competencies and identify organizations that may have employees which focus on IT functions as a primary or secondary competency.



<p>Improving short-term focus in these areas will yield high payoff to strategically aligning IT to the mission.</p>	Strategy and Planning: We chart IT's strategic direction based on the business's articulated strategies.	Disaster Recovery and Business Continuity Planning: We develop and regularly test enterprise plans to ensure continuous support of core business processes.
	Value Demonstration: We track IT metrics that link to business outcomes.	IT-Enabled Collaboration: We have created a toolkit and a set of communities that allows distributed staff to effectively share information and collaborate.
	Leadership Development: We provide high potential staff with customized training and development plans, including formal training, rotations, and project-based work.	Cost Transparency: We use unit-level visibility into infrastructure cost drivers to provide internal customers with the ability to effectively manage their demand.
	Enterprise Architecture: We maintain an architecture blueprint that clearly links technology choices to business capabilities.	Performance Reporting: We provide regular reports tailored by channel and content for specific business and IT audiences.
	Project Management and Execution: We manage projects according to a standard methodology and set of metrics to deliver within budget, scope, and schedule.	Application Design: We reuse application components and services to build new functionality and integrate existing systems.
	Business Case Discipline: We employ a standard business case template for all IT investments that captures project life-cycle costs, benefits, and risks.	Vendor Performance Oversight: We utilize a metrics-based scorecard to select and evaluate vendors based on standard performance criteria.
	Requirements Definition: We create alternative cost/ functionality scenarios for proposed IT projects to help business sponsors make informed funding choices.	Availability Management: We ensure the availability of systems based on SLAs that consider business criticality.
	Applications Maintenance: We programmatically reduce application maintenance costs year-over-year and retire legacy systems.	Life-Cycle Cost Efficiency: We effectively manage assets across their life cycle to maximize efficiencies.
	IT Staff Development: Our IT staff have transparency into role-specific competency requirements and opportunities for technical and business skills development.	Vendor Segmentation: We segment vendors based on strategic value and allocate management resources accordingly.
	Data and Knowledge Management: We provide the business with accurate, timely, required information.	Security Policies and Standards: We have defined and communicated a set of enterprise information security policies and standards.
<p>Continue to maintain the gains that have been made in these areas.</p>	Technology Innovation: We proactively scan for and exploit opportunities to deploy new technologies in support of the business.	Performance Management: We closely link compensation of senior IT staff to business outcomes.
	Portfolio Management: We help the business prioritize projects using a defined set of objective, weighted criteria.	Risk Management: We have created a principled framework for assessing relative risk and sequence risk mitigation investments accordingly.
	Process Digitization: We employ a standard methodology to proactively identify and exploit opportunities for business process automation and enhancement.	
<p>We are performing about as well as we should be in these areas.</p>		

Figure 18 - Assessment of Best Practice Competencies Within The CIO Organization

Since the assessment was completed, the MSFC CIO has been focusing on improving workforce competencies in the near-term and mid-term focus bands. These bands are consistent with improving workforce capability in the nine Core Function areas that have been identified in the "Strategy for Improving IT Management at NASA." An organization can build or improve capability/competency in several ways - retrain the existing workforce and grow the skill internally, look within other organizations to see if the skill is available and can be utilized, go to the outside and bring in the required capability, or utilize contractor-provided expertise to augment civil service capabilities. Each of these approaches has obviously has benefits and limitations.



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IT Competency Crosswalk With CMS Competencies						
Competency Name	Imp	Perf	Delta	Crosswalk 1	Crosswalk 2	Crosswalk 3
Strategy and Planning	4.7	2.5	-2.2	BITARCH	BITPLAN	BITSYS
Leadership Development	4.3	2.4	-1.9	LEADWORK	LEADTEAM	NASALEADER
Value Demonstration	3.9	2.0	-1.9	BITPLAN		
Project Management and Execution	4.3	2.5	-1.8	PROJPROGMT	PROJANALYSIS	TECHMMT
Enterprise Architecture	4.7	2.9	-1.8	BITARCH	BITSYS	BITPLAN
Requirements Definition	4.2	2.5	-1.7	BITPLAN	BUDGETMMT	
Applications Maintenance	3.9	2.2	-1.7	DATDBMMT	BITARCH	
Business Case Discipline	4.2	2.5	-1.7	BITPLAN	BITARCH	BITSYS
IT Staff Development	4	2.5	-1.5	TECWORKMMT	TECHMMT	LEADTEAM
Data and Knowledge Management	4.3	2.8	-1.5	LEADCOMM		
Technology Innovation	4.1	2.6	-1.5	BITPLAN	BITARCH	COMTEC
Process Digitization	3.8	2.5	-1.3	PROCESSENG	BITPLAN	
Portfolio Management	4.1	2.8	-1.3	BITPLAN	BUSMMT	BUDGETMMT
IT-Enabled Collaboration	4.0	2.8	-1.2			
Disaster Recovery and Business Continuity Planning	4.4	3.2	-1.2	BITPLAN		
Cost Transparency	3.7	2.6	-1.1	BITPLAN	COSTEST	
Performance Reporting	3.5	2.5	-1	BITPLAN		
Application Design	3.7	2.8	-.9	DATDBMMT		
Vendor Performance Oversight	3.7	2.8	-.9	CONMMT	ACQPLAN	
Availability Management	4.2	3.4	-.8	BITPLAN	BUSMMT	
Life Cycle Cost Efficiency	3.6	2.8	-.8			
Performance Management	3.3	2.7	-.6	TECHMMT	TECWORKMMT	NASALEADER
Security Policies and Standards	4.8	4.2	-.6	BITSECURE	SECURITY	
Risk Management	3.9	3.5	-.4	RISKMMT		

Figure 19 - Crosswalk Mapping of IT Competencies and CMS Profile Data

As an example, the CIO has augmented skills and capabilities in the relationship management functions for several key customers (Ares, Shuttle, and Science and Mission Systems) through a combination of internal and external placement, and use of contractor resources. The MSFC CIO went to an external hire to fill a critical key position with strong IT project management skills and capabilities that will enable the organization to capitalize on its project management strategy. And the MSFC CIO recently brought in an external hire to fill a critical key vacancy in Enterprise Architecture and has expanded its EA capability through the use of contractors to fill EA positions where timing was critical and civil service head count was restricted due to Center ceilings.

The MSFC CIO will continue to aggressively re-evaluate the workforce state and identify specific competency/skill demand profiles from customers and stake holders that require increased emphasis. In April/May 2008, the CIO will conduct a re-evaluation of competency/skill demand profiles as part of its annual IT workforce evaluation. The Top 5 most critical competencies will be identified as part of the annual exercise. Core skills for each competency area are identified and evaluated across the MSFC CIO workforce. Training requirements to address deficiencies in each of the skills areas will be established for each of the areas and a prioritized list of training will be identified to close the gaps in required/available skills. Where specific skills and competencies are not available, plans will be established to either augment those through internal/external hiring or through increased contractor support. This activity will allow the MSFC CIO to more effectively execute its requirements for resource management.



Relationship Management Capability/Approach

Relationship Management Is Key To Becoming A Mission Enabler

Information technology, as a mission enabler, is crucial to achieving NASA's U.S. Space Exploration Policy. For IT to become a mission enabling function, there must be strong alignment of customer expectations, IT capabilities, and process/performance management. This alignment begins with discovery and understanding of four key questions that define the relationship between the IT service delivery organization and its customers and stake-holders:

1. How do customer and stake-holders view the Office of the CIO and the role it should play in IT management at the Center and within the Agency?
2. What does the CIO need to excel at in order to grow its relationship with customers and stake-holders to the mission enabling level?
3. What does the CIO need to do to add value for mission and mission support customers?
4. How does the CIO sustain and improve its position as a mission enabler?

1. How do customer and stake-holders view the Office of the CIO and the role it should play in IT management at the Center and within the Agency?

The relationship level between the Center mission/mission support organizations and the IT service delivery organizations can be viewed from three levels - as a solid utility, a trusted supplier, and as a mission enabler.

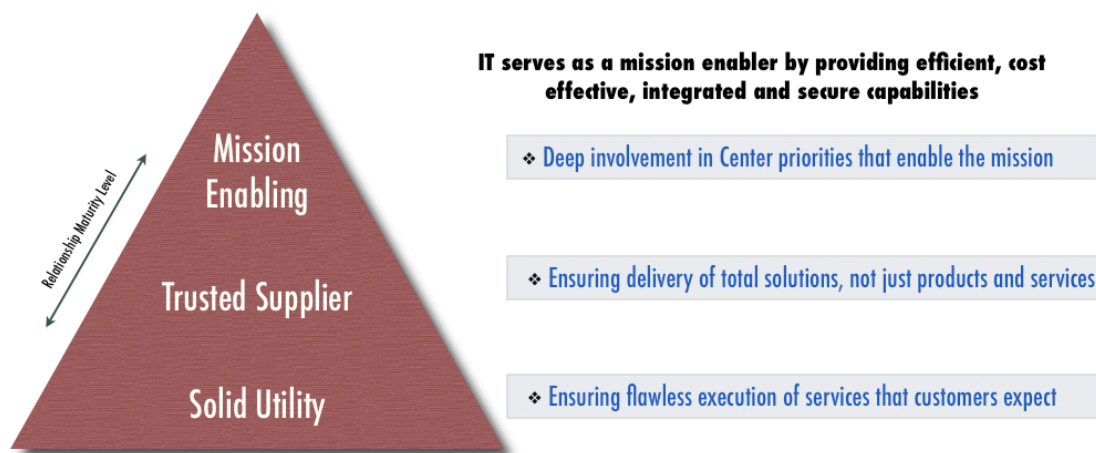


Figure 20 - Relationship Maturity Model for IT

It is important to realize the IT service delivery organization cannot achieve the *Mission Enabling* relationship level (i.e., it cannot have a deep involvement in Center priorities that enable the mission) without performing well as a *Solid Utility* (i.e., ensuring flawless execution of basic services that customers expect) and a *Trusted Supplier* (ensuring delivery of total solutions - not just products and services).



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In addition, customers may *perceive their current relationship level* with the CIO at one level, and *desire their future relationship level* to be at another. For example, the CIO may desire to have a *Missioning Enabling* relationship with all of its customers, while key mission customers may only desire the CIO to function at a *Solid Utility* level.

It is crucial to know the difference between perceived and desired relationship levels with each of the key customers and stake holders and not attempt to force a higher level of relationship than will occur naturally. Over time, and only through demonstrated execution on the part of the CIO, can relationship levels be improved from one level to the next.

The key take away point is that relationship levels are two-way and cumulative. Customers that do not want a mission-enabling level of relationship with the IT organization cannot be forced into it, and IT cannot be a mission enabler if it does not perform as a solid utility and a trusted supplier.

2/ What does the CIO need to excel at in order to grow its relationship with customers and stake holders to the mission enabling level?

At the Solid Utility level, the CIO has to focus on ease-of-use, reliability, delivery, quality, tangibility, and cost in the delivery of products and services. This focus includes improving on existing cross-organizational processes such as order delivery, incident and problem management, and configuration management, and performance management and monitoring (SLAs, and performance agreements). At the Solid Utility level, the CIO has to ensure flawless delivery of products and services.

As the CIO moves into the role of a Trusted Supplier, the focus begins to shift upward towards better accessibility and responsiveness, an increase in the knowledge and understanding of customer needs and completeness of requirements in providing total solutions to the Center. The CIO must show demonstrated capability to deliver IT projects within established cost, schedule, and technical requirements, while at the same time, maintain solid performance for basic product and service delivery capability.

As the CIO evolves into the role of a Mission Enabler, the focus continues to shift upwards towards providing fully-integrated collaborative tools and associated guidance that provide customers with deep visibility and business relevancy within the key customer segments. The Integrated Engineering Capability (IEC) is an example of this. In moving to this level, the CIO must be able to maintain the gains previously made in the Solid Utility and Trusted Supplier levels.

3/ What does the CIO need to do to add value for mission and mission support customers?

As the CIO demonstrates excellence in Solid Utility performance, and begins to establish itself as a Trusted Supplier and a Mission Enabler, it can drive relationship improvements by exceeding customer expectations in all areas. As a Solid Utility, the CIO must work to:

- Streamline customer self-service capabilities and ordering/tracking processes within product and service delivery.
- Provide tangible and high quality products and services relevant to mission needs.
- Consistently deliver reliable infrastructure services on-time and at reduced costs.

As a Trusted Supplier, the CIO must take specific steps to ensure the delivery of total solutions for customers and stake holders including:

- Re-evaluating and/or establishing service level agreements (SLAs) with a focus on consistent measurement of performance and costs.



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- Implementing improved and consistent project management techniques for development and implementation of IT initiatives.
- Implementing cost transparency, targeted analytics, and segmented customer profiles.
- Improving consistency in processes that support total solution delivery.

Only after the CIO demonstrates performance at the Solid Utility and Trusted Supplier level can the relationship between IT and customers move to a mission enabling level. At this level, the CIO should be well positioned to:

- Establish tailored SLAs for IT performance with specific customers based on unique mission and mission support needs.
- Begin to provide integrated knowledge management, analytical, and collaborative business tools.
- Have fully established the relationship management program with all key customers and stake holders
- Have in place a well-defined and mature enterprise architecture.

4. How does the CIO sustain and improve its position as a mission enabler?

Establishing IT as a strategic enabler of mission success requires clear definition and agreement with regard to the role and responsibility of the CIO at the Center. The Center must have well-defined strategies for:

- How IT initiatives will be managed and governed.
- How financial management processes, tools, and policies to will be implemented to provide full transparency and visibility into funding and investment control, costing and charge-back, budgeting and actuals tracking, and investment benefits realization.
- Managing expectations for Innovation and value generation to ensure architecturally compliant and insertion ready IT solutions.

Defining and Implementing A Relationship Management Framework

In 2006, the MSFC Office of the CIO conducted an in-depth customer experience assessment with key stake-holders and customers. The purpose of this assessment was to gain insight around the experiences customers have when interacting with the Office of the CIO in the planning and implementing IT products and services. The assessment focused on developing an understanding of mission and mission support customer expectations and covered several critical customer interaction touch-points including:

- Learning – How do mission and mission support organizations learn about what IT products and services are available from the CIO?
- Planning – How do mission and mission support organizations engage the CIO in identifying requirements and in planning for IT product and service purchases?
- Ordering – What processes and mechanisms are in place to support ordering specific IT products and services?
- Tracking/Receiving – What processes are in place to track and report the status of orders?
- Using – What problems do organizations experience when using CIO provided products and services?



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- Resolving – How well does the CIO resolve issues and concerns customers have with the products and services provided?

Although the customer experience assessment focused on the six interaction touch points, several significant observations were noted that identified a pressing need for the CIO to develop and implement a more focused approach to customer relationship management that would leverage best practices to define, architect, and deliver IT solutions that meet mission needs.

The observations included:

- The MSFC CIO was not considered the preferred provider of choice for IT products and services because it was not seen as being a trusted advisor/strategic enabler with many of the MSFC mission and mission support organizations.
- A fragmented IT service delivery approach by MSFC organizations, along with an inconsistent approach for organizational IT managers, computer security officials (CSOs), etc., resulted in increased service delivery costs and consequently drove organizations to seek other IT suppliers that offered lower costs for hardware and software.
- A customer perception of a mismatch between the capabilities and skills of CIO employees and IT service demands led organizations to look for alternative service providers.

Based upon the results of this assessment, the MSFC Office of the CIO defined and implemented a relationship management framework that positions a strategic interface between the CIO and key stake-holders and customer to ensure alignment between customer expectations and CIO-provided services.

Acting as a strategic advisor to the organization, the IT Solutions Architect/Solutions Specialist was created to focus on a strategic understanding of the customers' needs and oversees the planning, design, development, and implementation of an information technology solutions architecture that addresses mission-critical objectives and works as a liaison between the CIO and the organization to ensure standards, policies, and principles for the integration of the business, application, information, and technology architectures are communicated and followed.

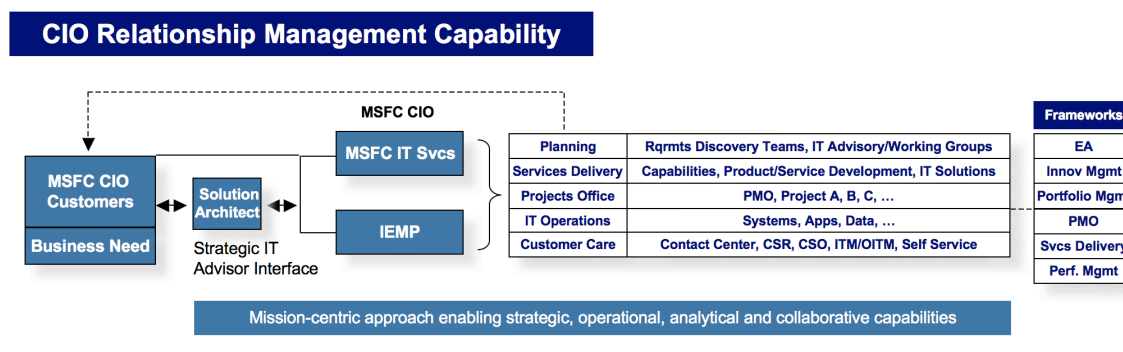


Figure 21 - MSFC IT Relationship Management Framework (conceptual)



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In addition, and working in close cooperation and in conjunction with the MSFC Chief Enterprise Architect, the Solutions Architect/Solutions Specialist ensures a well-integrated enterprise architecture that addresses improved decision making and by reviewing and eliminating inefficient and redundant processes, and focuses to optimize the portfolio of the organizations information assets and investments.

As a strategic IT advisor, the IT Solutions Architect/Solutions Specialist, enables IT service delivery:

- Through well-informed, effective IT decision making through awareness and support of MSFC CIO capabilities.
- By assisting requirements discovery teams in documenting organizational needs, standards, policies, and business processes.
- Providing close coordination of IT project activities and resources between CIO and the customer.

The MSFC CIO Relationship Management framework is tightly aligned with the Agency's emphasis on relationship management in the new IT management strategy. The MSFC CIO has successfully implemented this model with several key mission organizations – the Ares Project Office, Science and Mission Systems Office, and Shuttle Propulsion Office. Building on this successful model, the CIO will expand the Solutions Architect roles across the defined IT portfolio segments (Engineering Applications, Project Management Applications, Business Management Applications), subject to Center approval.

Establishment of strategic relationship management capability through the IT Solutions Architect/Solutions Specialist role forms the cornerstone for the IT service delivery organization to align the planning, development and implementation of IT product/service delivery with mission requirements and ensures compliance with NASA policy, architecture, and security requirements.



Innovation Management Capability/Approach

NASA leadership has identified four principles that define the IT environment and serve as a guide for IT planning and decisions within the Agency. IT must be mission enabling, integrated, efficient, and secure. Managing innovation and change in the IT environment require a disciplined approach to identifying potential candidate technologies that will enable NASA to invest in the right IT solutions that provide the greatest benefit to the NASA mission.

Investing in the right solutions that provide the greatest benefit to the mission requires an innovation management framework in which mission and mission support information requirements are clearly defined and documented, solutions are systematically evaluated and selected on the basis of demonstrated benefit, and deployed and utilized within the context of a reliable, efficient, secure, and well-managed enterprise architecture.

How Innovation Management Supports The Vision For IT At NASA

During the past year, the MSFC CIO has reevaluated the fundamental role of IT innovation management to ensure that it is fully aligned with NASA's vision for IT management and supports the strategic initiatives as set forth in the Agency's "Strategy for Improving IT Management at NASA."

Vision for Information Technology At NASA	Supporting Role of Innovation Management
NASA invests in the right IT solutions that provide the greatest benefit to the NASA mission	Innovation Management provides a methodology to systematically capture and evaluate potential ideas and technology solutions that can benefit the mission
IT systems are seamlessly deployed and utilized across Center boundaries	Innovation Management works across organizational boundaries to provide early insight into challenges and opportunities for system integration and deployment
IT projects selected and executed by NASA provide expected benefits, such as return on investment (ROI), improved collaboration capability, improved security, etc.	Innovation projects and activities are evaluated and traded in a business case environment and measured and monitored through the use of performance scorecards that measure idea creation, value generation, and outcome potential
IT at NASA makes information accessible, integrated, and actionable for mission programs	Innovation Management tightly couples voice-of-the-customer requirements with evaluation activities and makes the assessment information readily available to customer and stakeholders
NASA CIOs provide a reliable, efficient, secure, and well managed IT infrastructure that customers rely on rather than compete with	Innovation Management leverages and builds on best practices and a learning structure that encourages and rewards mission and mission support customers to use the CIO as their trusted advisor
NASA CIOs are credible, trusted partners in solving mission and business problems	Innovation Management utilizes well-defined processes and measurements that boost the CIO's credibility as a mission-enabling partner

Table 6 - Aligning Innovation Management With NASA's Vision For IT



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For an IT innovation management framework to be fully successful, it must have a top-level commitment from the Center's leadership, be a directed effort combining strategy/process/culture, have a focus on providing people-centered technology, and have a focal point that is accountable for improving processes, practices, and learning within the existing culture.

In order for IT to support the Center's execution of the Agency's IT management strategy, the MSFC CIO has implemented an innovation management process that identifies, characterizes, validates, and disseminates architecturally-compliant, insertion-ready technologies that are effectively managed for risk and cost. The innovation management framework addresses this approach from both a strategic and operational perspective.

Aligning Innovation Management With Strategy Through IT Roadmaps

The MSFC CIO plans to utilize a technology roadmap framework process to align the Center's innovation management strategy with the organization's ability to execute product and service delivery capability, facilitate improved collaboration and communication with customers and stake-holders, and deliver architecturally-compliant, insertion-ready IT solutions that are matched to mission needs.

An important part of the commitment to innovation management is to communicate and practice a strategy that applies the appropriate emphasis and balance between *incremental* innovation and *radical* innovation. Incremental innovation in IT involves improving product and service delivery, reengineering/tweaking business processes, adjusting business models in response to changes in customer demand, and applying technology improvements to existing products and services.

In contrast, radical innovation in IT involves step-change that depends on recognizing, leveraging, and applying significant change resulting from major technology leaps or market entry of an entirely new class of enabling IT products and services. Incremental innovation in IT has a sustaining impact in product and service delivery, while radical innovation typically has a very disrupting impact to existing product and service delivery strategies. Achieving the right balance and mix of incremental and radical innovation are critical to aligning innovation management capability with the vision for improved IT management at NASA.

Innovation road mapping is ideally suited to support a strategy-driven approach to innovation. An IT roadmap visualizes the IT strategy and defines and communicates the plan for executing and realizing the strategy. Roadmaps will help align the Agency IT strategy, people, process, and technology with the execution process. Roadmaps represent the big-picture view of innovation management and aligns organizational domains with activities, dependencies, deadlines, and execution timeframes.

The MSFC CIO plans to utilize IT roadmaps to:

- Translate IT strategy into innovation initiatives.
- Visualize and communicate innovation drivers and enablers.
- Ensure maximum leverage and utilization of IT assets.
- Capture and disseminate knowledge for communicating with customers.
- Reduce uncertainty and facilitate change management.
- Identify and eliminate projects that are out of alignment with customer needs.

Several types of innovation management roadmaps will be developed as shown in Figure 22 below, including emerging information technology roadmaps and specific product/service technology roadmaps. Roadmaps will be used to develop broad consensus about a set of mission and mission support needs (e.g., improved collaborative capabilities) and



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information technologies required to satisfy those needs, forecast technology developments in targeted areas, and provide a framework to plan, coordinate, and evaluate candidate information technology solutions.

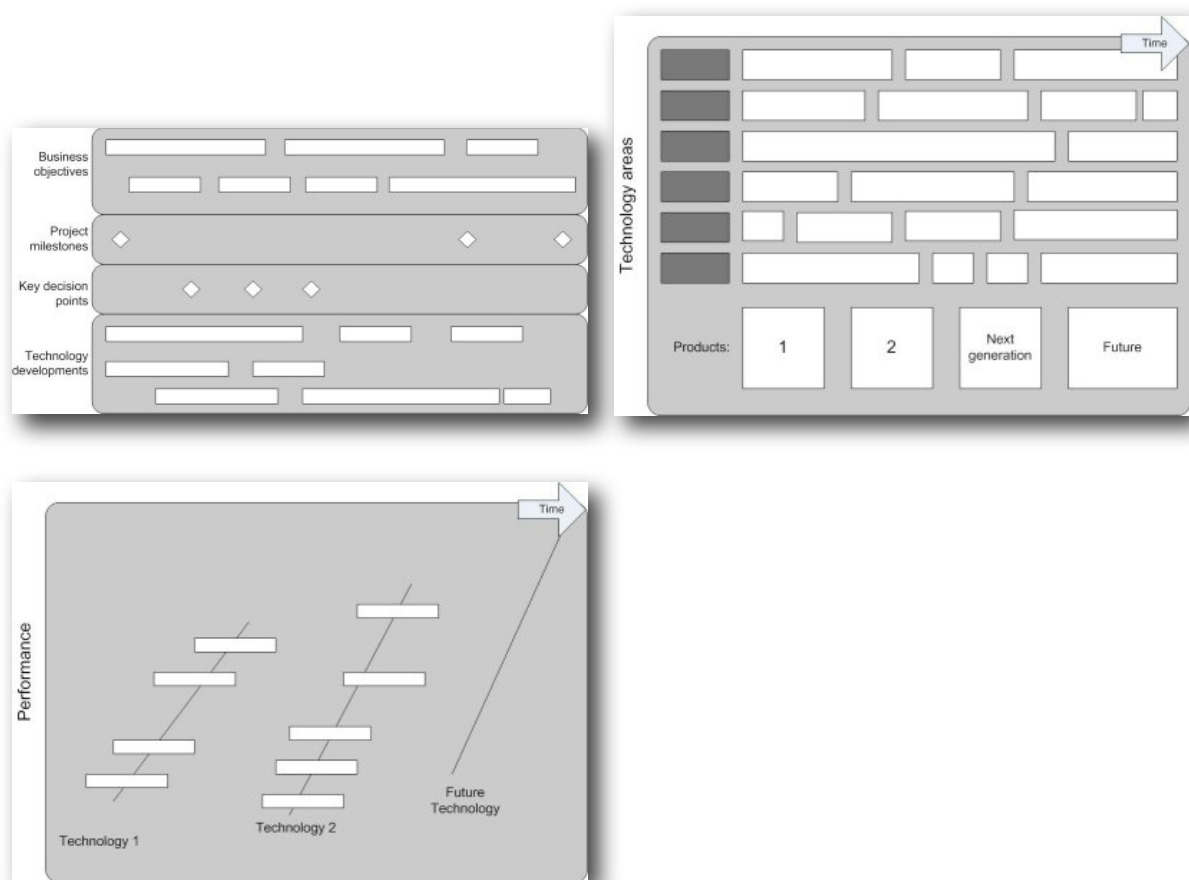


Figure 22 - Innovation Management Roadmap Samples

Innovation Management - The Information Technology Evaluation Process

A primary goal of the MSFC IT innovation management framework is to deliver characterized and validated technologies that are traded against other candidate options in a business case environment for inclusion in the enterprise architecture “to-be” state. The IT Evaluation Process (ITEP) framework provides mechanisms to identify trends in information technology advancements, methods to systematically conduct the evaluation of innovative technologies and capture the evaluation results within a centralized repository accessible by the MSFC community, and to communicate the insertion impact strategy to the MSFC community.



Framework for IT Innovation Management

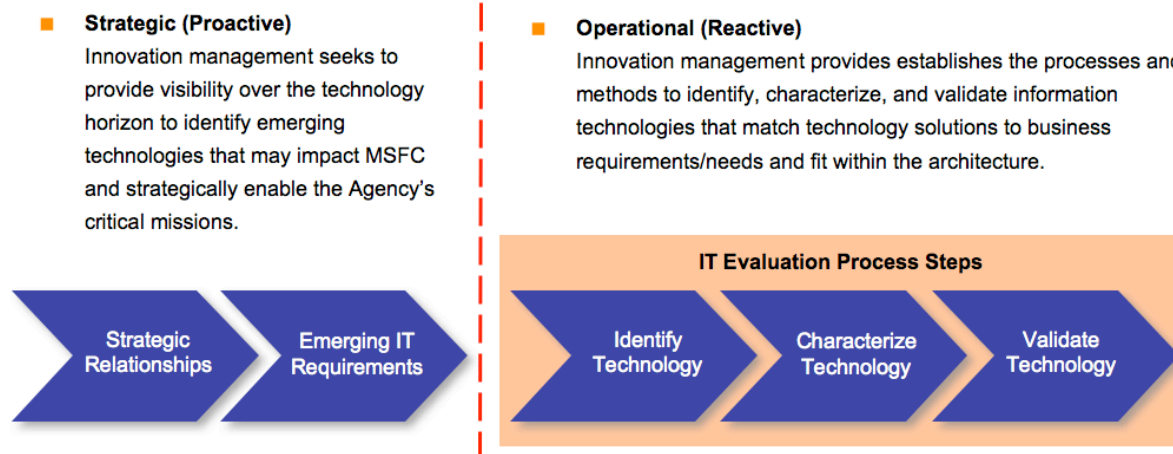


Figure 23 - Innovation Management - IT Evaluation Process

Historically, IT innovation and evaluation have been performed in disconnected, small organizational groups from across the Center. This resulted in inconsistent approaches used to identify, characterize, and validate potential technology innovations and insert them into the architecture. In many cases, evaluation efforts were not tied directly to meet specific mission requirements and in some cases, there was an inadequate anticipation and understanding of the direction and maturity of the information technology as it was being selected. Identification of candidate technologies is largely driven by vendor sales/advertising, and the evaluation and implementation costs, benefits, and risks are largely going undocumented and not being disseminated to the MSFC community or made available to other NASA Centers.

As a result, substantial time and costs are being expended across the Center when individuals/organizations perform their own research and evaluation, and focus groups and testing labs are established to evaluate innovations in information technology without having clear mission-oriented objectives.

Identifying Architecturally-Compliant Candidate Technologies Managed For Risk, Cost, Mission Alignment

The framework for IT Innovation Management is aligned with and supports the proposed IT governance model, quantifies and documents costs/risks/benefits, incorporates strategic drivers and analytical rigor into the IT management process, and facilitates the dissemination and communication of emerging information technologies that impact and improve the products and services that meet mission requirements.



The framework for innovation management provides a consistent methodology for identifying candidate technologies that are architecturally-compliant and ready for insertion into the existing infrastructure.

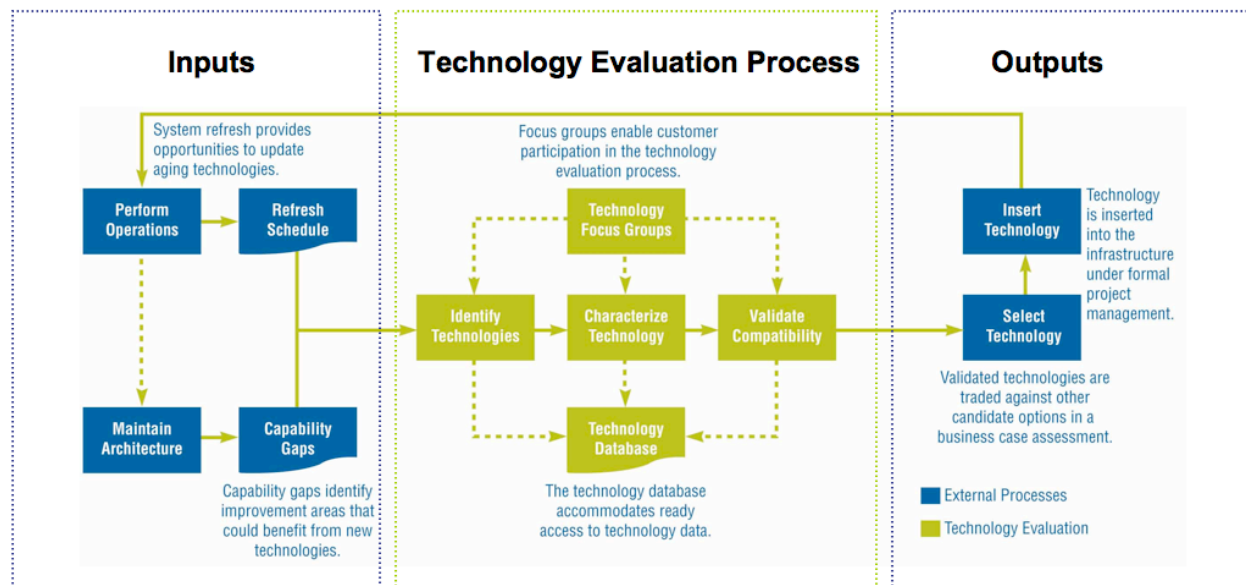


Figure 24 - Innovation Management Technology Evaluation Process

What Can MSFC Expect To Gain From Innovation Management

An IT Innovation Management Framework is fundamental to implementing the Agency's new IT management strategies. As the Agency implements the new strategies, MSFC can expect to realize the following benefits:

- Actively engaging the customer in identification of mission and mission support needs and how emerging IT solutions can support those needs.
- Implementation of a systematic approach to evaluating candidate technologies in order to better align IT service delivery with the mission.
- Integration, capture, and dissemination of the IT innovation management work that is being done across the Center today by individuals and organizations.
- Well-informed investment decisions using information compiled over time, using a broad range of Center and Agency expertise, and traded against other potential solutions in a business case assessment for inclusion within the enterprise architecture.



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Portfolio Management Capability/Approach

Agency Approach to Portfolio Management

The Agency Strategy for Improving IT Management At NASA provides a well-defined approach for IT Portfolio Management. The goal of the IT Application Portfolio strategy is to leverage a portfolio view of existing IT application assets throughout NASA with the objective of improving the performance of the individual assets within the portfolio as well as the performance of the portfolio as a whole.

The Agency began by establishing portfolio-level performance objectives that ensure that the current and future requirements of the mission and programs are/will be met in the most efficient way. Short and long-term goals have been established for the strategy.

The Agency's short-term goals of moving to an application portfolio program are to:

- Create a basis for a consistent set of application-related discussions.
- Develop a platform for communicating the status of the application environment.
- Determine the overall IT skills required to support NASA's business environment.
- Learn how NASA's applications interact with each other (or do not interact) to support NASA's future goals of collaboration.

Longer-term, the goals of the Agency's IT Portfolio strategy are to:

- Reduce the total number of applications that are being developed and sustained (from 2,500 to a significantly lower number).
- Reduce complexity of the application and platform environment.
- Identify major issues associated with applications or groups of applications.
- Identify improvements to established applications and new applications that cross traditional program and Center boundaries.
- Realize cost avoidance through economies of scale and enterprise licensing.
- Lower data center/infrastructure costs through decommissioning and consolidation.

IT Application Portfolio Requirement

The requirement for the Agency CIO is to develop an application management approach for organizing and managing application and integration standards at the Agency, Center, and Program levels.

This approach involves establishment of an Application Portfolio Management (APM) framework that provides for the ability to do the following:

- Easily organize applications into relevant categories for decision making.



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- Consistently evaluate the relative importance and performance of steady-state applications.
- Prioritize which assets require resources (people and \$\$) in any given budget cycle.
- Answer the question: What things should I spend money on/or apply management cycles to in this budget cycle?

The APM framework establishes a portfolio-level approach for IT applications and IT infrastructure and provides for the following:

- Establishes ownership for different portfolio business domains.
- Enables better understanding of the full spectrum of business capabilities and issues for a specific business area.
- Facilitates relevant future actions (informs the PPBE process).
- Respects and enforces the boundaries of NASA's architecture, standards, governance, and strategic direction.

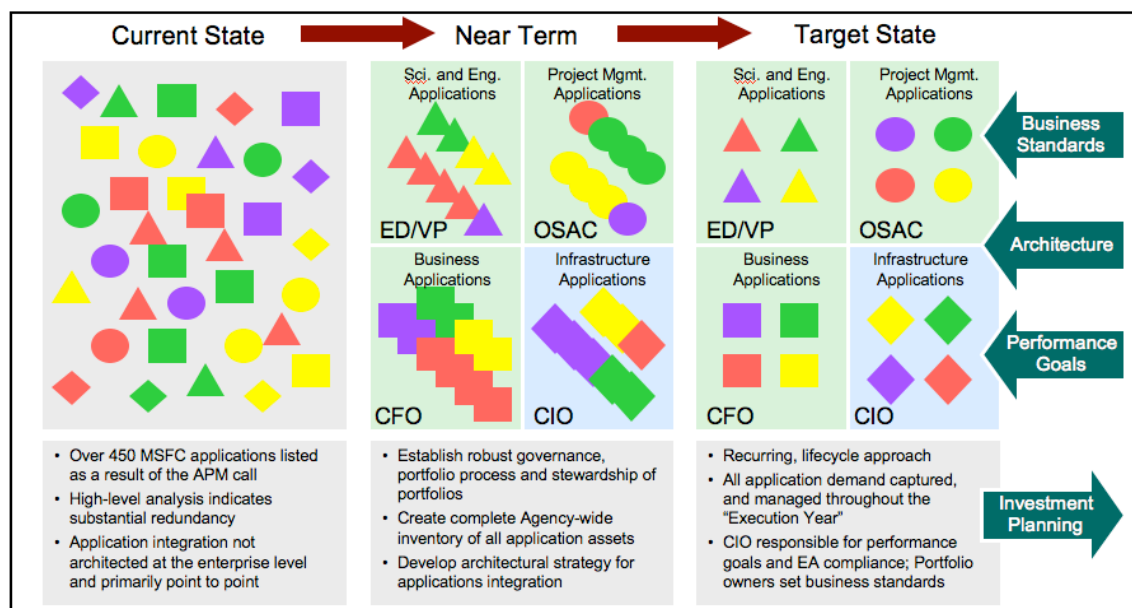


Figure 25 - MSFC Portfolio Management Strategy

MSFC's Portfolio Management Strategy

MSFC is participating as a member of the Agency IT APM team to define and implement the frameworks for managing the applications portfolio across the Agency. The Agency has defined four portfolios for IT



applications - science and engineering applications, project management applications, business management applications, and IT Infrastructure applications.

MSFC recently completed a data call to capture, analyze, and report all IT applications at the Center by the portfolios that have been defined. The purpose of this data call was to document the current state of the IT applications portfolio at MSFC, identify a target to-be state and document the gaps and develop near term objectives to address the gaps between the as-is and to-be states.

MSFC identified 459 applications across the Center. The initial high-level analysis indicated Center application integration has not been architected at the enterprise level, resulting in duplication/redundancy across many MSFC organizations.

The data call did not identify highly specialized applications since this portfolio element has been initially excluded from consideration under the new Agency strategy.

Table 7 below shows the current distribution of applications at MSFC by IT portfolio segment.

Applications Portfolio	Sub Portfolio Element	Typical Content Types
Science and Engineering Applications 80	<ul style="list-style-type: none"> Engineering Tools (57) Scientific Tools (12) Program (Product) Life Cycle Management (11) 	<ul style="list-style-type: none"> CAD/CAM/CAE Quality Management Simulation, Modeling Technical Library Bill of Materials Configuration Management
Project Management Applications 22	<ul style="list-style-type: none"> Project Planning and Execution (21) Supply/Demand Planning (1) 	<ul style="list-style-type: none"> Integrated Product Suites Scheduling, EVM Budgeting Risk Management Supply/Demand Management
Business Management Applications 175	<ul style="list-style-type: none"> Analytics (2) Financial (14) Human Capital Management (25) Mission Support Services (84) Asset Management (27) Procurement/Contracts Management (23) 	<ul style="list-style-type: none"> Operations, Workforce, Financial Analytics Accounting, Budgeting, Travel Management Workforce, Competency Management, HR Safety, Health, Environmental Plant, Property, Equipment Procurement, Contracts Management



Applications Portfolio	Sub Portfolio Element	Typical Content Types
Infrastructure Applications 182	<ul style="list-style-type: none"> Business Process Modeling (32) Collaboration (61) Help Desk (2) Messaging (1) Web Portals/Web Services (86) 	<ul style="list-style-type: none"> BPM/Micro Flow Email, Calendaring Help Desk Applications, Document/Records Management Knowledge Management, Enterprise Portals, Web Sites

Table 7 - IT Current IT Portfolio Segmentation

The Agency APM Team has identified the following go-forward framework for the applications portfolio management process. As the Agency continues to define its process for applications portfolio management, MSFC will apply and implement the Agency guidance to more effectively manage its IT applications portfolio.

APM Process Steps

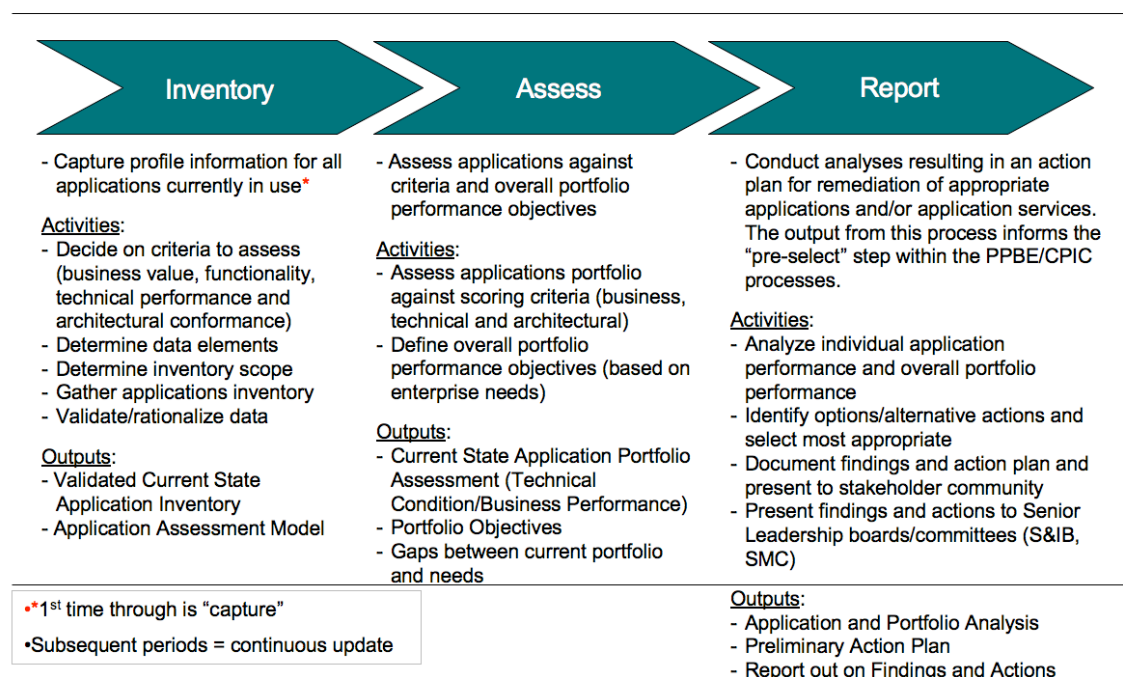


Figure 26 - Agency IT Application Portfolio Management Go-Forward Strategy



Service Management & Delivery Capability/Approach

MSFC Service Management and Delivery as defined in the Strategy for Improving IT Management at NASA document is currently performed and managed within several CIO organizations as noted in the Table 8 and Table 9 below. These organizations also perform functions listed within the other eight CIO Core Functions including Governance and Policy, Enterprise Architecture, IT Security, Relationship Management, Resource Management, Innovation Management, Project Management, and Performance Management. The current capabilities resident in the above organizations related to the other core functions are discussed in their respective sections of this document. The functions currently performed by these organizations related to Service Management and Delivery at MSFC are shown below in Table 8.

IS10 IT Security Office	IS20 Planning, Policy & Integration Office	IS30 Applications, Web, & Multimedia Services Office	IS40 Networks, Telecom, & Desktop Services Office
<ul style="list-style-type: none"> Center IT Security Program Center Information Systems Change Board (ISCB) IT Security Policy, Procedures And Guidance IT Security Training And Awareness IT Security Risk Management IT System Certification And Accreditation IT Security Contract Requirements And Assessments IT Security Audit Coordination IT System Vulnerability Scanning And Mitigation Monitoring And Intrusion Detection Security Incident Response Computer Forensics And Investigation Support IT Security Operations Support IT Security Center (ITSC Application) 	<ul style="list-style-type: none"> Strategic Planning Risk Management Project Management Office Enterprise Architecture Customer Relationship Management IT Evaluation Planning Organizational Performance IT Policy Coordination Directives Management Records Management Forms Management Scientific And Technical Publications IT Acquisition Visibility IT Portfolio Management Safety Travel Action Tracking 	<ul style="list-style-type: none"> SW Applications Life Cycle Support For MSFC Business, Administrative, Engineering & Science Customers Web Development And Maintenance MSFC Web-Master Graphics And Management Publications STI & Technical Publications Support Proposal Development Photography - High-speed Digital Television Services Streaming Media/Podcasts Animations Printing & Reproduction Special Events Video Documentation 508 Compliance Support 	<ul style="list-style-type: none"> NASA Integrated Services Network LAN/WAN Desktop Services Support Russian Services Support Help Desk Telecom Operations Cell Phones/Pagers/Radio Services Michoud Assembly Facility IT RF Spectrum Management Emergency Warning System Classified Communication Systems IT Disaster Recovery & COOP IP Address Management IP V6 Conversion Agency Network Architecture Board Intrusion Detection & Security Operations Center

Table 8 - Services Provided by MSFC CIO Organizations (IS10, IS20, IS30, IS40)



IS60 IEMP Business Processes and Applications Support Office	IS70 Systems Engineering and Operations Office	IS80 IEMP Application Development & Software Assurance Office
<ul style="list-style-type: none"> • Business Process And Application Technical Support For Sustaining Operations And Projects • Requirements Analysis, Design, Configuration And Implementation • Internal Controls, Federal Laws And NASA Policies/Procedures Compliance, Audit Coordination And Support • Release Management Planning And Execution • Liaison To Center Business Process Leads , Business Systems Functional Owners, And Governance Committees • Business Readiness And Competency Center Customer Care • Support Agency Initiatives Related To Business Systems And Processes (e.g., NSSC; M/BSIG) 	<ul style="list-style-type: none"> • MSFC Mid-Range Computing Support <ul style="list-style-type: none"> • Consultation/Integration/ Delivery • IEC/DDMS • Distributed Systems (user Owned) • ECS (EADS) • Document Repository • Hosted MSFC/ODIN Applications • Agency IT Support <ul style="list-style-type: none"> • NASA Data Center Services • 4663 Computing Facility • Mainframe Services • Mid-Range Provisioning, Housing, And Hosting • Sharepoint, Brio • Agency Projects <ul style="list-style-type: none"> • CBACS, PIV, NISE (NAMS/ IDMS/CIMS) • NCAD, SESAAS, ICE • IEMP Engineering & Operations <ul style="list-style-type: none"> • SAP Architecture, Engineering, & Operations • Storage & Database Integration • Security, COOP, Systems Management 	<ul style="list-style-type: none"> • Software Development Procedures For IEMP Business Applications • Software Quality Assurance Policy • Application Development & Business Analyst Support For Sustaining Operations & Projects • Requirements Management And Test Management Toolsets • IEMP Enterprise Service Bus Technology • Project Management Support • Internal/External Audit Support • Agency Enterprise Architecture Support • Concept Of Operations Planning For IEMP

Table 9 - Services Provided by MSFC CIO Organizations (IS60, IS70, IS80)

Description of Key Services:

Applications and Web Services

MSFC Service Management and Delivery core capability currently includes a mature process for delivering quality Applications and Web services to all Center organizations. This capability includes a wide variety of skills that ensure the strategic vision for these services is executed effectively and successfully using a common framework based on industry best practices. This common framework is referred to as simply the Software Engineering Framework (SEF).

The OCIO recognized that establishing and propagating a common framework for delivering applications and Web service was extremely important because:



- Technology and software needs are constantly changing.
- Software development continues to grow more complex.
- Government and contract standards, rules, guidance, and even laws continue to be added.

The relationship the SEF plays in the Center, Agency and Government environments is illustrated below:

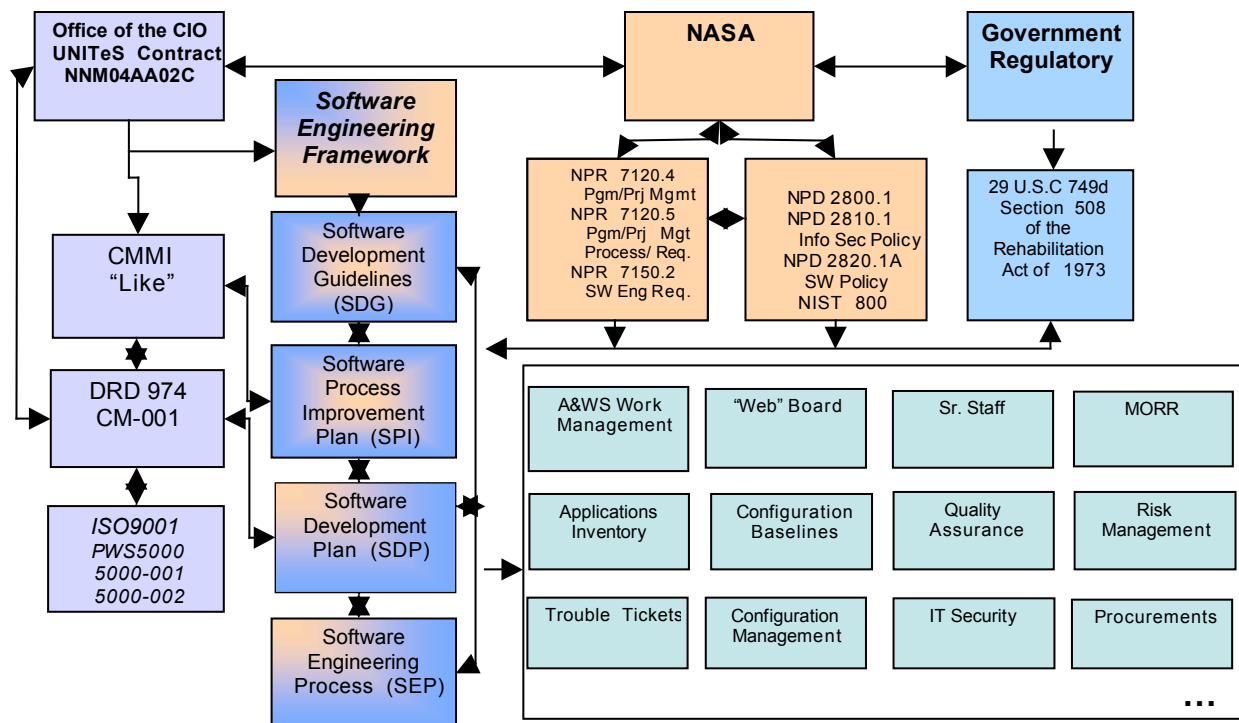


Figure 27 - CIO Software Engineering Framework Touch Points

The SEF is comprised of four primary subparts: the Software Development Guide (SDG), the Software Development Plan (SDP), the Software Engineering Process (SEP) and the Software Process Improvement Plan (SPIP). These are illustrated in Figure 28 below:

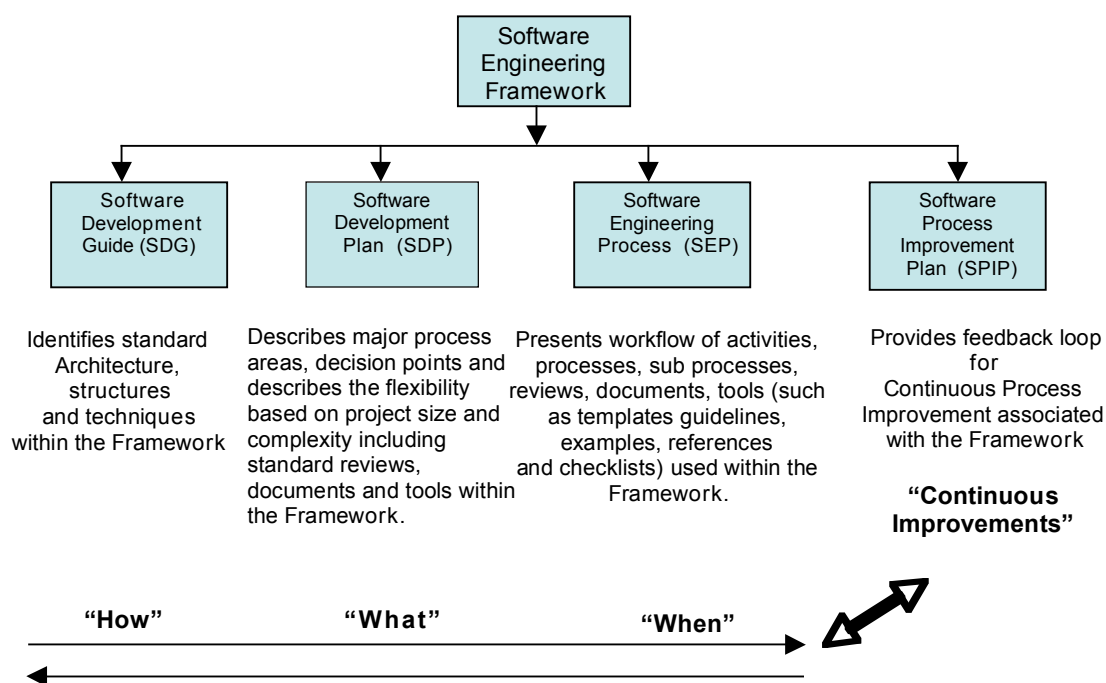


Figure 28 - CIO Software Engineering Framework Touch Points

The SEF can best be described as a series of defined, tracked, monitored and phased events and decision points for Software Projects and is flexible enough to adequately address project differences. The SEF is an important piece of the MSFC Service Delivery core capability because:

- It promotes product quality as well as both external and internal compliance to regulations and guidance.
- It communicates the what, when and how to developers, managers, customers and all stake-holders.
- It evolves and is continually evaluated for improvements.
- Over time and with maturity, it reduces cost, schedule and quality risks for software projects, a known high dollar IT Investment.

Software Development Guide (SDG)

The Software Development Guidelines (SDG document) establishes the approach to standardization and guidance for managing the application and data architecture design in support of software engineering at MSFC. The SDG is intended to serve as a useful reference tool, providing guidelines for applications developers and insight for management.



Software Engineering Process (SEP)

All activities related to the implementation of projects, project management and software engineering, are managed through the SEP. In each life-cycle phase, project elements may vary depending on the project's category, life-cycle model, type, and tailoring. These factors should be documented in the Software Development Life Cycle (SDLC). The SEP is presented in Figure 29 Software Engineering Process (SEP).

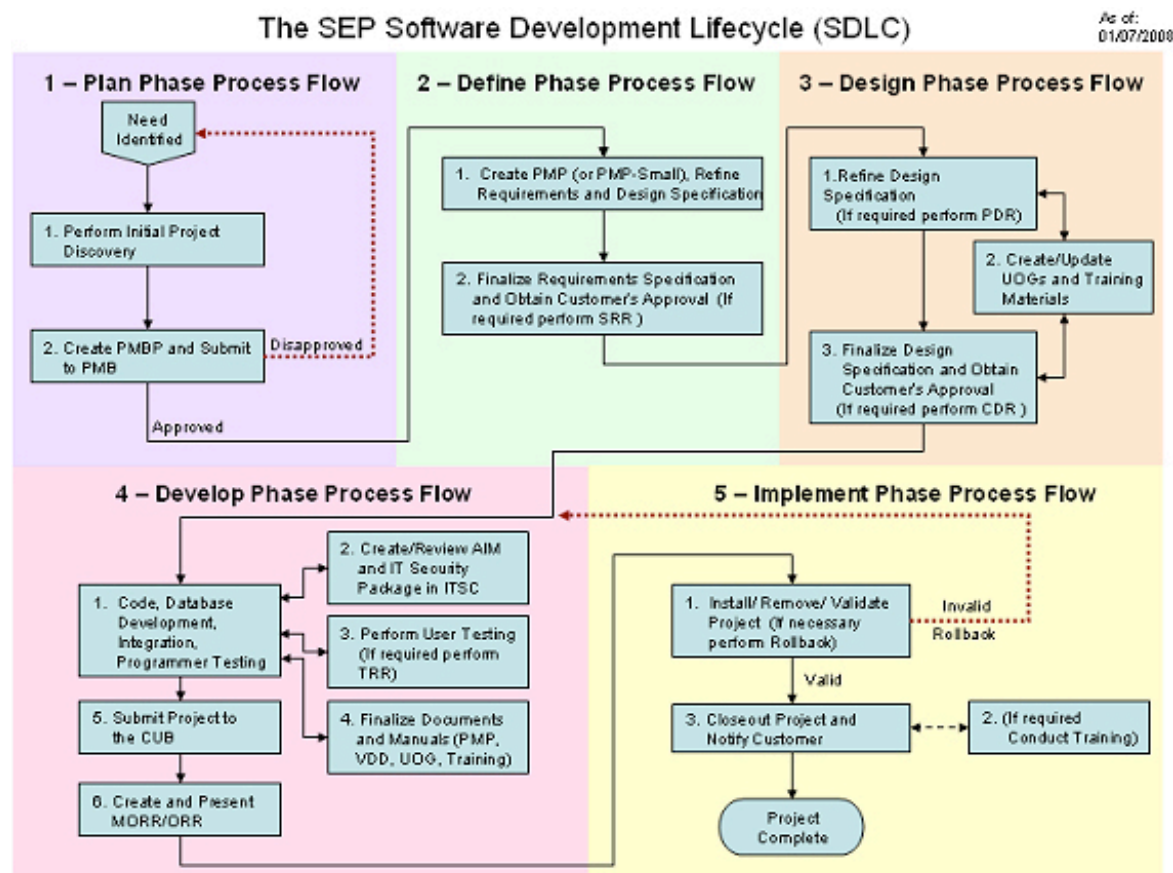


Figure 29 - CIO Software Engineering Development Life-cycle

Plan Phase

Rigorous planning of the project life-cycle is essential to a well-engineered and efficiently maintainable product. The SEP Plan Phase Process Flow and associated sub-processes provide both workflow and activities to successfully complete



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the process. Additionally, specific project planning elements must be completed in order to continue to define, design, develop and implement customer requirements. The following sections describe the major decisions and are supported by tables and graphical illustrations as appropriate.

Define Phase

The requirements definition and analysis process is one of the most critical processes of software engineering. The SEP Define Phase Process Flow and associated sub-processes provide both workflow and defined activities to successfully complete the process. Studies show that the most common problems in the software industry are due to poor requirements elicitation, inadequate requirements specification, and inadequate management of changes to requirements.

Requirements definition provides the foundation for the entire life-cycle as well as for the software product. Evolved requirements also provide a basis for enhanced planning and estimating. As depicted in the SEP, it is important that there is on-going customer validation of the requirements to ensure the end products meet the customer needs. This validation can be accomplished via prototyping and/or customer involved reviews of iterative and final software requirements.

Design Phase

Architectural design is concerned with creating a strong overall structure for software entities that fulfill allocated system and software-level requirements. The SEP Design Phase Process Flow and associated sub-processes provide both workflow and activities to successfully complete the process. Typical views captured in an architectural design include the decomposition of the software subsystem into design entities, Computer Software Configuration Items (CSCI), definitions of external and internal interfaces, dependency relationships among entities and system resources, and finite state machines. Detailed design further refines the design into lower level entities that permit the implementation by coding in a programming language. Typical attributes that are documented for lower level entities include: identifier, type, purpose, function, constraints, subordinates, dependencies, interface, resources, processing, and data.

Develop Phase

Software development is concerned with creating mature code that transforms the design entities into automated processes that fulfill the requirements and needs of the intended audience. The SEP Develop Phase Process Flow and associated sub-processes provide both workflow and activities to successfully complete the development process. This process flow also encompasses all activities related to pre-production implementation.

Implement Phase

Software implementation takes the tested and delivered code and packages it for implementation and user acceptance in its intended production environment. Implementation includes user training, if applicable. The SEP Implement Phase Process Flow and associated sub-processes provide both workflow and activities to successfully complete the implementation or rollback of the implementation processes.



Software Support Engineering

Software Support Engineering consists of functions that support the successful implementation of Software Engineering Projects such as Risk Management, Configuration Management, Quality Assurance, and Measurement and Analysis. Each support function has a corresponding plan within the SEP. Brief summaries are provided in the following sections.

Software Process Improvement (SPI)

Software Process Improvement (SPI) addresses the evolution and maturity of the SEF and its components over time. Figure 30 Software Process Improvement Model represents a continuous flow of Plan, Do and Assess.

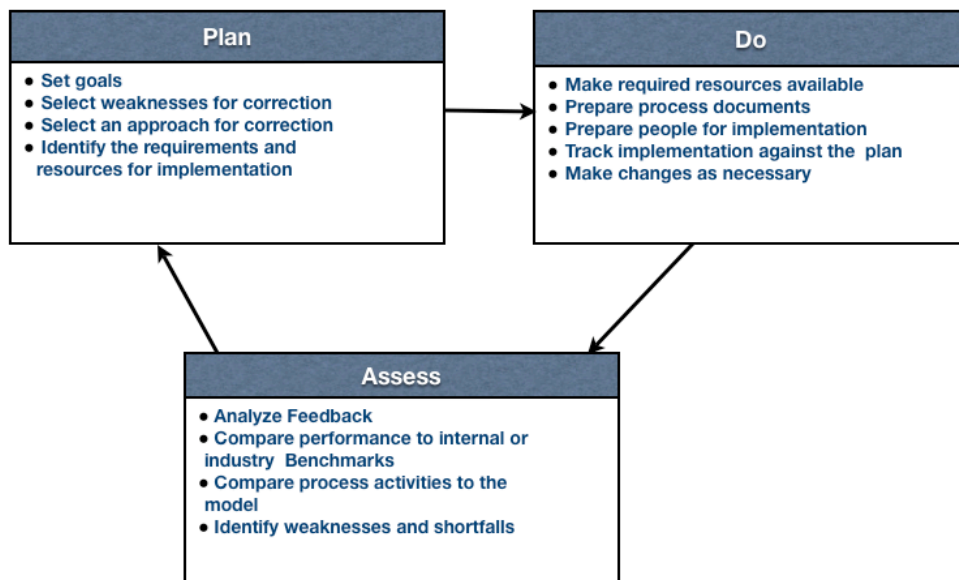


Figure 30 - CIO Software Engineering Framework Touch Points

Applications and Web Services Future Approach

The SEF was designed and implemented as an ever-evolving applications and Web services process that would serve MSFC now and in the future. Everything the SEF offers today will still be offered in the future, but it will evolve to keep up with advancing technologies. The most prevalent of these is the integration of Service Oriented Architecture (SOA) design.

SOA is a conceptual business architecture where business functionality, or application logic, is made available to SOA users, or consumers, as shared, reusable services on an IT network. "Services" in an SOA are modules of business or



application functionality with exposed interfaces, and are invoked by messages. The following graphic illustrates the growth of the SEF at MSFC, and how it is envisioned for the near future:

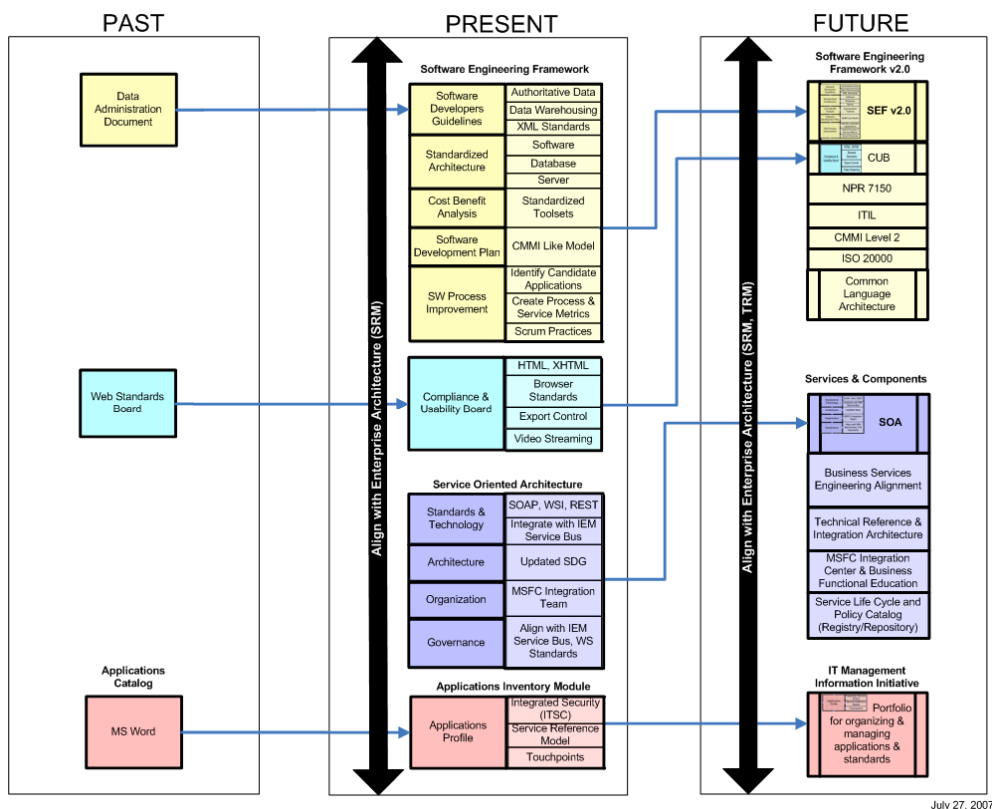


Figure 31 - Software Engineering Framework Adoption - Past/Present/Future

Help Desk

The NASA Information Support Center (NISC) is an integrated 24 hour-a-day/7 day-a-week (24/7) call center, providing Agency and Center customers with a single source of assistance and problem resolution for IT services. It provides first- and second-level support for both MSFC and Agency-wide hardware and applications. The NISC is responsible for all aspects of trouble ticket processing; network (enterprise) monitoring and surveillance; major outage notifications; activity scheduling; password resets for desktop and mainframe systems; and MSFC mainframe user account management. The NISC also provides after-hours executive staff support for the NASA Administrator, The Office of Security and Program Protection (OSPP) and the MSFC Center Director. As the alternate MSFC Emergency Operations Center, the NISC



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monitors local weather, and makes local notification in the event of a personal injury, hazardous spills, bomb threats, severe weather alerts, and any emergency reported by a 911 caller.

Servers and necessary infrastructure are protected and managed by the MSFC Building 4629 Disaster Recovery and COOP Plans, as well as by the NISC Disaster Recovery and COOP plans.

The NISC completed the 24x7 Operations Consolidation in 2006 which brought together the NISC, NASA Security Operations Center, NASA Data Center Computer Operators, and Enterprise Network Management Center Monitors. Future Plans include working toward continual improvement goals to achieve greater efficiencies within a consolidated 24x7 organization, resulting in greater first-call resolution, more self-service options, and even higher customer satisfaction. New services are added continually as new projects and applications are launched that require call center support.

IT Infrastructure Approach

NASA's IT model divides IT infrastructure into four categories or portfolios - Infrastructure Applications, End User Services, Communications Services, and Data Center Services. Each of these portfolios is supported by discrete sets of technologies and processes. This taxonomy of infrastructure services and supporting technologies provide the basis for developing the architecture that will be required to align and deliver IT services based on specific mission needs.

MSFC's approach to IT infrastructure is to treat all cross-organizational infrastructures as a set of unified, enterprise-wide services throughout their life cycle from formulation, to operation, to retirement. Highly specialized infrastructure requirements will be managed consistent with the enterprise approach for formulation and a federated model for implementation and operation.

Organizations will provide infrastructure requirements, high level design considerations, and cost/schedule inputs through the associated portfolio manager/solutions architect and through participation in the MSFC IT SIB and MSFC Enterprise Architecture Advisory Committee. The CIO will provide detailed IT infrastructure design and development capability and ensure solutions are integrated, deployed, and operated consistent with the mission needs and the enterprise architecture.

This approach places decision authority, oversight, compliance, and execution coordination in the MSFC Office of the CIO and ensures that mission and mission support organizations provide oversight role for implementation and operation of infrastructure that is not an Agency-provided service. This approach will ensure the consistency of infrastructure services built and operated across the Center to better enable collaboration, user mobility, security, and leverage of Center infrastructure investments.



IT Infrastructure Approach

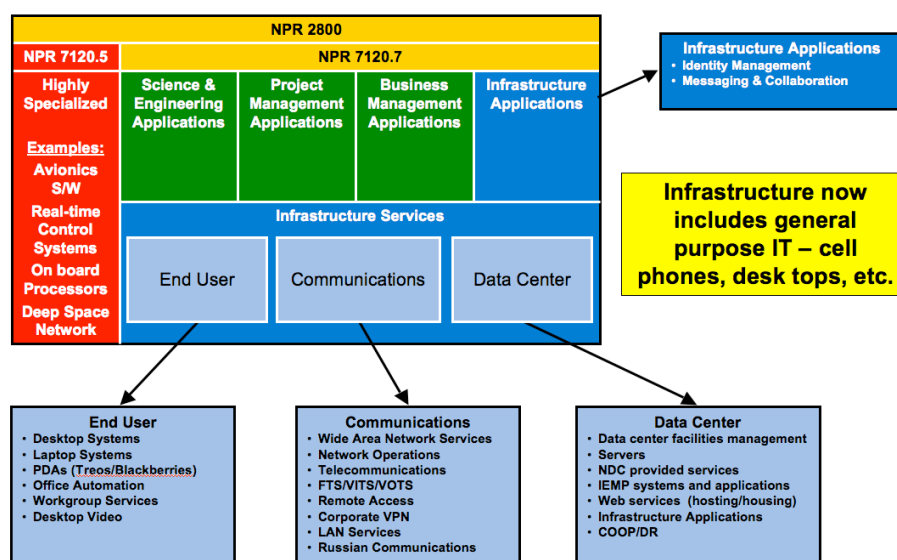


Figure 32 - Software Engineering Framework Adoption - Past/Present/Future

Near term actions for the IT infrastructure include:

- Developing and refining infrastructure operational models to specify data center, network consolidation, and infrastructure operations to-be states.
- Developing a comprehensive Service Level Agreement (SLA) - based service catalog and cost recovery model for IT system management, e.g., floor space, security, operating system and storage management, network connectivity, and disaster recovery/continuity of operations.
- Encourage consolidation of IT resources and establish baseline provisioning of infrastructure services.
- Revise acquisition/sourcing strategies for end-user, communications, and data center services.

MSFC'S Future Service Management and Delivery Capability Approach

Further processes analysis will need to be undertaken to determine how the above capabilities will adapt to support and enable the new strategy for managing IT at NASA. This analysis will involve the following:

- Understanding how the current processes, people (including organization structure), technology, strategy, and controls currently provide services to the Center.



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- Understanding how well the current processes, people, technology, strategy, and controls support the strategy for Improving IT Management at NASA and identifying potential gaps.
- Defining a future concept of operations that supports the strategy.
- Identify the processes, people, technology, strategy, controls and appropriate high-level organizational structure needed to support the future concept of operations.
- Perform a Gap Analysis between the current state and the future state which includes identifying process gaps/ changes, staffing/training gaps, and accountability gaps.
- Develop detailed organizational design including new organization structure, staffing alignment, key processes, and performance measures.
- Develop a communication and change management plan.
- Develop a transition and implementation plan which includes training plans, staffing plans, and funding plan.



Project Management Capability/Approach

Project management includes a wide variety of skills that ensure the strategic vision for development projects is executed effectively and successfully. In support of MSFC's execution of the Agency's IT strategy, the MSFC CIO will structure the organization to clearly allocate responsibility for project management. This will include providing key concepts and frameworks in support of the MSFC CIO project management community and the establishment of an MSFC CIO project management office within the organization. Key to this strategy is that each organizational department will have project managers responsible for their department's projects. This organizational structure in combination with collaborative project management has sought to consistently classify and align key projects within the MSFC portfolio to a standardized implementation life-cycle and reporting methodology, and to enhance the overall project management process and capability. This structure and approach is fully aligned with the concept of core CIO organizational capabilities derived from the skill sets and competencies of the civil servants and contractors, and will include processes for establishing and following standardized policies, governance structures, and process discipline.

Project Management as a Discipline

The objective of establishing a collaborative project management discipline is to strengthen capabilities across a spectrum of project management competencies and a wide variety of projects that support IT infrastructure services; IT applications, and "Highly Specialized" IT. These competencies are wide ranging and encompass all aspects of project and engineering necessary to perform development, modernization and enhancement projects.

Comp ID	Title	PM Competency Description
PMC-1	Best Practices and Standards	Develops and maintains the project management methodology for effective program and project execution. Develops policies, procedures, templates and tools. Manages and tracks the portfolio of projects to ensure they are properly coordinated and are being effectively run. Reports the results to other parts of the organization such as Business Management.
PMC-2	Project Management	Provides experienced project managers to organize and manage projects throughout the life-cycle. Oversees/manages project performance, conducting milestone and deliverable reviews to assess quality, on-time and on-budget delivery.
PMC-3	IT Project Portfolio Management and Reporting	Focuses on organizing a series of projects into a single portfolio that will provide reports based on the various project objectives, costs, resources, risks and other pertinent associations which are used to make key financial and business decisions for the projects.
PMC-4	Project Consulting	Provides project management consulting services and training to organizations within CIO as well as within the business units. Assists on projects within and outside CIO by providing advice on project management best practices and standards.



Comp ID	Title	PM Competency Description
PMC-5	Requirements Management	Provides resources with an understanding of the business processes to support requirements definition, and the translation of business requirements to technology requirements; manages functional and technical requirements; works closely with customer relationship managers to ensure that business requirements are met in an effective and efficient way.
PMC-6	Application Development	Provides resources to develop application solutions. Activities include designing, building, testing and deploying enterprise and customer specific applications. Provides Tier 3 support.
PMC-7	Application Integration	Provides resources to perform detailed design services, development and operations support for all middle-ware, integration, service-oriented-architecture (SOA) services and business process management (BPM) technologies. Provides Tier-3 support.
PMC-8	Business Intelligence	Provides resources to perform detailed design services, development and operations support for all scorecard, dashboard, online-analytical processing (OLAP) reporting, and ad hoc reporting and data quality applications. Provides the capabilities to turn data into critical information and knowledge that can be used to make sound business decisions. Performs data modeling and metadata maintenance. Provides Tier-3 support.
PMC-9	Web Design and Development	Provides resources to perform detailed design services, development and operations support for all portal and presentation technologies. Provides Tier-3 support.
PMC-10	Infrastructure Engineering	Provides resources to develop and implement IT infrastructure. Activities include designing, building, testing and deploying enterprise and customer specific IT infrastructure. Provides Tier-3 support.
PMC-11	Solutions Architecture	Provides resources to design engineering services to project teams. Translates business requirements into overall conceptual designs and solution blueprints that align with technology strategies and standards.
PMC-12	Consulting	Provides resources to consult in various areas such as technology, service management and architecture. Understands the strategic direction of the enterprise and the supporting IT systems and architectures.
PMC-13	Technical Writing	Provides resources to create and maintain IT documentation for various target audiences such as user manuals, program documentation, training manuals, and operational procedures.

Table 10 - Project Management Core Function Competencies

Alignment of Project Management Competencies

Given the need for collaboration and integration of these competency areas, the MSFC OCIO office has aligned primary responsibility for the project management functions to departments as identified below.



	CIO Org	IS10	IS20	IS30	IS40	IS60	IS70	IS80
		IT Security	Planning, Policy & Integration	Application, Web, & Multimedia Services	Networks, Telecom, and Desktop Services	Business Processes and Applications	Systems Engineering and Operations	Applications Development and Software Assurance
PMC-1	Best Practices and Standards	L	P					
PMC-2	Project Management	P	P	P	P	P	P	P
PMC-3	IT Proj. Portfolio Management		P					
PMC-4	Project Consulting	L	P	L	L	L	L	L
PMC-5	Requirements Management	L	P	L	L	L	L	L
PMC-6	Application Development			P		P		P
PMC-7	Application Integration			P			P	P
PMC-8	Business Intelligence	L	P	L	L	L	L	L
PMC-9	Web Design & Development			P				P
PMC-10	Infrastructure Engineering				P		P	
PMC-11	Solutions Architecture	L	P	L	L	L	L	L
PMC-12	Consulting	P	P	P	P	P	P	P
PMC-13	Technical Writing	P	P	P	P	P	P	P

P	Primary - Responsible for competency policies, best practices, implementation and continuous learning.
L	Liaison - Responsible for competency as it applies to specific department

Table 11 - Alignment of Project Management Core Functions Within Current MSFC CIO Organization Structure



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Establish A Collaborative Project Management Approach

To accommodate the three project management competencies of Best Practices and Standards (PMC-1), IT Project Portfolio Management and Reporting (PMC-3), and Project Consulting (PMC-4), the MSFC OCIO will establish a collaborative Project Management Office (PMO) that will work with the project managers within each department to develop cohesive project management policy, best practices and monthly reporting. Each department will be responsible for developing their staff to meet the defined project management (development) competencies.

The MSFC CIO IT project management office (PMO) will provide project management analysis and reporting to the MSFC IT Strategy and Investment Board, and Center IMSB and CMC for designated MSFC and Agency IT projects and initiatives. The IT PMO will:

- Develop, recommend, and implement best practices and standards for a consistent project management methodology for effective IT project planning, development, and implementation across CIO organizations.
- Review, analysis, and communication of new or changes to existing NASA project management directives, requirements, and processes to project managers managing designated IT projects and initiatives.
- Develop and implement common IT project management policies, procedures, templates, and tools designated MSFC and Agency IT projects and initiatives.
- Analyze and track the performance of IT project initiatives to ensure they are being properly coordinated and effectively managed; and report the results to MSFC IT decision entities for appropriate review and action.
- Provide a focus on organizing like-projects into common portfolios to provide analysis and reporting on project objectives, costs, resources, risks, and other key decision point data used to make investment decisions during the life-cycle.
- Provide project management consulting services, application of best practices and standards, and training to MSFC organizations as required to ensure compliance with established NASA project management policies, directives and requirements.

The PMO will make recommendations to the MSFC CIO, who is the decision authority (DA) for the MSFC IT projects.

Collaborative Project Management Benefits

A collaborative PMO approach is essential to executing the Agency's new IT management strategies. As more focus is put on IT project management around the Center, additional benefits will be realized in the form of direct and clear portfolio visibility, and through the following advantages:

- Provide clear insight into the performance of the organizations portfolio of IT investments.
- CIO Project reporting and compliance as proposed by the IT strategy guidelines.
- Institute and facilitate better collaboration across the organization.



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- Provide detailed and standardized frameworks, processes, measures, and the roles and responsibilities across project implementation.
- Institute better coordination of project management activities, processes, resources across the organization.
- Improved resource utilization, reporting, and overall project quality.



Performance Measurement Capability/Approach

Measuring Organizational Performance in Key Management Emphasis Areas

The MSFC CIO defined and implemented an operational capability to measure performance across six key management emphasis areas - costs/financial, people, security, innovations and value generation, product and service delivery, and quality of IT projects.

The overall goal in developing the CIO scorecard was to identify and define a set of leading indicators that would measure how well the CIO organization was operating and how it was progressing along the relationship management maturity model - i.e., how was it functioning as a Solid Utility, a Trusted Supplier, and as a Mission Enabler.

The six management emphasis areas shown in Figure 33 were initially aligned to measure progress from both an internal organizational perspective as well as an external customer-facing perspective.

In looking at how well the organization was functioning as a Solid Utility, the focus was to identify key performance indicator (KPI) metrics that would show the health of contractor operating performance, CIO workforce utilization/staffing/capabilities, and customer satisfaction.

In determining how well the organization was performing as a Trusted Supplier, the focus was to identify key performance indicator metrics for IT security, service level compliance, and project management performance.

From the perspective of how well the organization was being viewed as a Mission Enabler, the focus was to identify key performance indicator metrics for CIO participation in strategic Center/Agency initiatives, maturity of the Enterprise Architecture, and establishment of integrated collaborative engineering and business solutions for the Center.

As the organization began to develop specific metrics for each of the key management emphasis areas, seven questions were applied to each of the proposed metrics:

- What specific management area are we trying to address with the metric and how does it support improving the relationship maturity of the organization?
- What does the metric measure - specifically, what does the metric count and how will the organization establish and implement a set of metric-triggered action plans to address performance issues?
- If the organization optimized a specific metric, what other aspects of the organization would be affected?
- How hard/difficult/expensive is it to collect this information? Is the collection effort worth the effort?
- Does the collection of a specific metric interact with or interfere with other established business practices or processes?
- How accurate will the information be after it is collected and how will the validity of it be ensured?
- Over time, can a management emphasis area be measured by other metrics or in another way that is easier to collect, more accurate, or more timely?

For each of the planned metrics, the MSFC CIO established a set of common assessment criteria. This ensures that all metrics are identified, defined, calculated, and monitored with a consistent methodology.

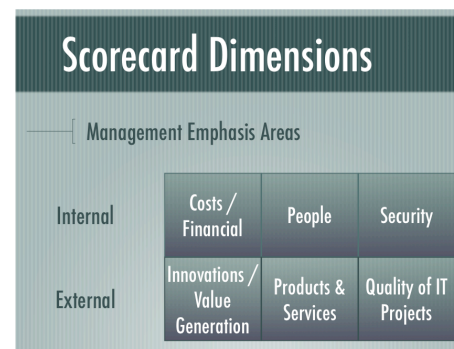
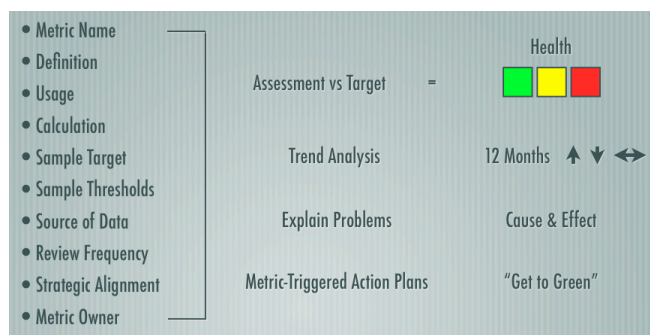


Figure 33 - CIO Management Emphasis Areas



Each metric is assessed against a defined target to identify and determine current period performance.

Problem metrics are noted along with a cause and effect analysis. Metric-triggered action plans are developed to "Return the Metric To Green."

A history is maintained to provide trend analysis capability.

In developing the first-generation scorecard, the MSFC CIO initially identified 64 potential metrics that would measure the overall performance of the CIO.

Figure 34 - Metric Definition and Assessment Criteria

The CIO leadership team conducted a series of discussion and evaluation sessions and consolidated the initial set of metrics down to 16 across the 3 relationship management levels and 6 management emphasis areas.

In mapping the metrics to the maturity level of the relationship management model, 6 of the 16 metrics were defined as Solid Utility measures, 5 of the 16 metrics were defined as Trusted Advisor measures, and 5 metrics were defined as Mission Enabler measures. Within the context of the six management emphasis areas, 2 of the metrics represented Costs/Financials, 2 metrics represented the IT People area, 4 represented IT Security, 2 represented Innovation/Value Generation, 4 represented IT Products/Service Delivery, and 2 represented Quality of IT Projects.

	Relationship Maturity Level		
Management Emphasis Area	Solid Utility	Trusted Advisor	Mission Enabler
Costs/Financial	<ul style="list-style-type: none"> Contractor performance against spend plan MSFC IT Cost per Workforce 		
IT People	<ul style="list-style-type: none"> Progress against building strategic competencies Progress against filling staffing plan 		
IT Security	<ul style="list-style-type: none"> Progress against completing required IT Security Training 	<ul style="list-style-type: none"> Security Incident Response and Reporting 	<ul style="list-style-type: none"> Number of systems achieving system C&A Weaknesses closed
Innovations & Value Generation			<ul style="list-style-type: none"> Progress against completion of EA definitions and active use CIO participation in strategic projects



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Products and Services	<ul style="list-style-type: none"> Customer satisfaction index for IT service performance from automated surveys 	<ul style="list-style-type: none"> Service level agreement compliance Customer satisfaction index from customer satisfaction surveys at IEMP 	<ul style="list-style-type: none"> Customer experience index for IT services
Quality of IT Projects		<ul style="list-style-type: none"> Project schedule attainment index Project risk management attainment index. 	

Table 12 - Defined metrics within IT Relationship Maturity Level & Management Emphasis Areas

For each of the key performance metrics, owners were assigned, baseline/targets and thresholds were established. Metric owners assess metric performance monthly and provide inputs regarding metric health to the CIO scorecard review team, consisting of the CIO, direct reports, and metric owners.

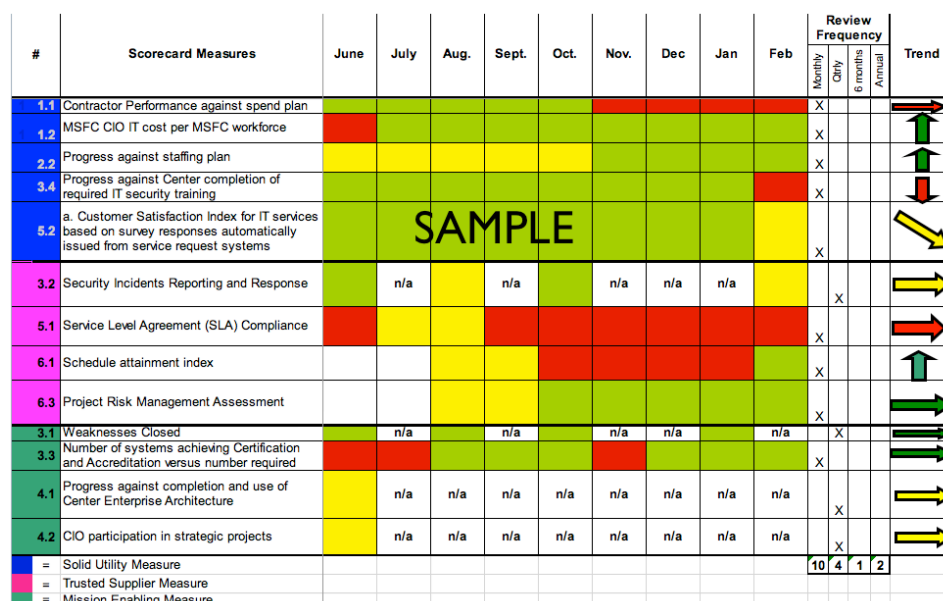


Figure 35 - Sample CIO Scorecard showing trends for each KPI metric area.

The CIO scorecard review team meets monthly to review issues with metrics that are Yellow or Red, discussion identification of cause/effect and plan of action to return the metric area to Green.

The combination of well-defined service level agreements (SLAs) that cover key infrastructure applications and services, and an organizational scorecard that provides insight into performance within key management emphasis areas provides



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the Center and the CIO with an overall picture of how well the IT services delivery organization is performing as a mission enabling capability.

Over time, the CIO will review and modify SLAs and the organizational scorecard to better provide an improved set of leading indicators that measure how well the organization is performing and how well it is progressing within the Solid Utility, Trusted Supplier, and Mission Enabler relationship maturity levels.

The long-term goal is to establish the CIO as a high performing organization that ensures delivery of highly reliable and cost-effective infrastructure services, ensure the the office is well-positioned and capable of providing MSFC organizations with integrated and secure IT solutions, and is deeply involved in Center priorities that enable the mission.



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Service Level Agreements and Metrics for IT Service Delivery

Defined Service Level Agreements for Key IT Infrastructure and IT Applications Portfolio Areas

The CIO currently has in place a number of SLAs to cover key IT Infrastructure services portfolio, including the NASA Data Center - 2 measures, the NASA Integrated Services Network (NISN) - 14 measures, ODIN - 4 measures; and IT Applications portfolios (IEMP Core Financial - 15 measures, Travel Manager - 10 measures, and STARS - 10 measures).

Within the NASA Data Center, the established SLAs and performance metrics cover system availability and application availability on the IBM z9 mainframe:

- IBMz9 Availability – goal = 99.9%
- IBMz9 Application Availability – goal = 99.8%

For NISN, the established SLA, performance metrics and targets cover mission and mission support system and infrastructure availability, reliability; ViTS/VoTS conferencing availability and problem resolution, and Russia Services mission and administrative wide area network availability:

- Mission Support Infrastructure Availability – goal = 99.95%
- Mission Infrastructure Availability – goal = 99.95%
- Standard Routed Service (SIP) Availability – goal = 99.5%
- Premium Routed Service (PIP) Availability – goal = 99.5%
- SIP MTTR – goal < 24 hours
- PIP MTTR – goal < 4 hours
- Mission Operations Proficiency – goal = 99.5%
- Activity Scheduling Compliance – goal = 99.5%
- ViTS Availability – goal = 99.5%
- VoTS Availability – goal = 99.5%
- ViTS Conference Impacts – goal < 9
- VoTS Conference Impacts – goal < 9
- Russia Services Mission WAN Availability – goal = 99.98%
- Russia Services Admin WAN Availability – goal = 99.95%

The ODIN contract has an SLA with four metrics and covering catalog and desktop services delivery, availability, and customer satisfaction:

- Desktop User Services – Service Delivery – goal = 98%
- Desktop User Services – Availability – goal = 98%
- Desktop User Services – Customer Satisfaction – above satisfied – goal >92%
- Catalog Services – Service Delivery – goal = 98%

For IT Applications including IEMP Core financial, Travel Manager, and STARS, SLAs establish performance metrics and targets for a wide range of hardware, software, and application availability, problem reporting and resolution including:

IEMP – Core Financial:

- SAP R3 Hardware Availability – goal = 99.8%
- SAP R3 Application (User) Availability – goal = 99.8%
- BW Application (User) Availability – goal = 95%
- ITS Application (User) Availability – goal = 99.8%



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- In any 1-month period, 95% of Severity 1 problems will be resolved within 4 hours
- In any 1-month period, 100% of Severity 1 problems will be resolved within 8 hours
- In any 1-month period, 90% of Severity 2 problems will be resolved within 8 hours
- In any 1-month period, 100% of Severity 2 problems will be resolved within 16 hours
- In any 1-month period, 90% of Severity 3 problems will be resolved within 24 hours
- In any 1-month period, 100% of Severity 3 problems will be resolved within 48 hours
- In any 1-month period, 90% of Severity 4 problems will be resolved within 5 business days
- In any 1-month period, 90% of modifications will be done on time
- In any 1-month period, 90% of Priority-1 changes will be resolved in 1 business day
- In any 1-month period, 90% of Priority-2 changes will be resolved in 2 business days
- In any 1-month period, 90% of Priority-3 changes will be resolved in 8 business days

IEMP – Travel Manager:

- System Availability – goal = 99.8%
- Travel Manager Application (User) Availability – goal = 100%
- In any 1-month period, 95% of Severity 1 problems will be resolved within 4 hours
- In any 1-month period, 100% of Severity 1 problems will be resolved within 8 hours
- In any 1-month period, 90% of Severity 2 problems will be resolved within 8 hours
- In any 1-month period, 100% of Severity 2 problems will be resolved within 16 hours
- In any 1-month period, 90% of Severity 3 problems will be resolved within 24 hours
- In any 1-month period, 100% of Severity 3 problems will be resolved within 48 hours
- In any 1-month period, 90% of Severity 4 problems will be resolved within 5 business days
- In any 1-month period, 90% of modifications will be done on time

IEMP – STARS:

- System Availability – goal = 99.8%
- Travel Manager Application (User) Availability – goal = 99.8%
- In any 1-month period, 95% of Severity 1 problems will be resolved within 4 hours
- In any 1-month period, 100% of Severity 1 problems will be resolved within 8 hours
- In any 1-month period, 90% of Severity 2 problems will be resolved within 8 hours
- In any 1-month period, 100% of Severity 2 problems will be resolved within 16 hours
- In any 1-month period, 90% of Severity 3 problems will be resolved within 24 hours
- In any 1-month period, 100% of Severity 3 problems will be resolved within 48 hours
- In any 1-month period, 90% of Severity 4 problems will be resolved within 5 business days
- In any 1-month period, 90% of modifications will be done on time

SLAs however, only cover performance expectations for a subset of defined products and services provided through the IT service delivery organization. They do not by themselves provide a complete picture of the overall health of the organization nor do they portray a full and complete picture of how well the organization is performing with regard to key management emphasis areas or the relationship maturity model as defined earlier.

To get a more complete picture of organizational health, it requires a broad look at CIO organizational performance from a number of different areas and perspectives. The CIO has defined a framework for organizational performance that will align mission delivery expectations with organizational performance in six key management emphasis areas that would give insight into how well the organization was executing as an enabler of the mission.



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Section Three - **Realignment Tasks**

IT Governance

Enterprise Architecture

IT Security

Resource Management

Relationship Management

Innovation Management

Service Management and Delivery

Project Management

Performance Measurement



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IT Governance Task Plan

Date	Task	Target Date
January 2008	<ul style="list-style-type: none"> Draft IT governance approach and submit for review to Center IT Implementation Team 	Complete
February 2008	<ul style="list-style-type: none"> Develop draft charters for recommended IT governing bodies Review of charters for MSFC IT SIB and MEAAC by Center Implementation Team 	Complete
March 2008	<ul style="list-style-type: none"> Provide initial overview of IT governance model to Center Integrated Management Systems Board 	Complete
April 2008	<ul style="list-style-type: none"> Provide final overview of IT governance model to Center Integrated Management Systems Board Receive concurrence from Center Integrated Management Systems Board for new IT governance approach Conduct initial review to identify CIO policies/procedures and identify policies that require revision for alignment with Agency guidance and policy Finalize and submit IT governance charters into MSFC Management System review process Draft common processes and responsibilities for project management and IT operations within the Office of the CIO 	April 4, 2008 April 4, 2008 April 30, 2008 April 30, 2008 April 30, 2008
May 2008	<ul style="list-style-type: none"> Develop communications strategy for revised IT governance model [May 15, 2008] Finalize common processes and responsibilities for project management and IT operations within the Office of the CIO Complete MSFC Management System Review of IT governance charters. 	May 15, 2008 May 30, 2008 May 30, 2008
June 2008	<ul style="list-style-type: none"> OPRDs finalize and submit required changes of policy documents into MSFC Management System review process 	Jun 30, 2008
July 2008	<ul style="list-style-type: none"> Complete MSFC Management System Review of any required policies, procedures, charters Communicate/implement governance change management process at MSFC (down and out to organizations) 	July 15, 2008 August 30, 2008
August 2008	<ul style="list-style-type: none"> Begin to implement and operate under new IT governance structure, policies, processes 	Sep 1, 2008

Table 13 - IT Governance Implementation Schedule



Enterprise Architecture Task Plan

Date	Task	Target Date
TBD	Dependent on Agency EA Strategy <ul style="list-style-type: none"> Develop EA Strategic Implementation Framework <ul style="list-style-type: none"> Specific plan for integration with IT Strategic Planning Integration with IT Portfolio Management Specific process to measure Enterprise Architecture use within newly implemented MSFC governance policies 	TBD
April 2008	<ul style="list-style-type: none"> Identify and Map Enterprise Business View for MSFC <ul style="list-style-type: none"> Describe NASA's missions along with supporting MSFC mission and general management business functions. Map MSFC organizations to identified mission and general management functions. Understand and document any organizational or project objectives that fall within functional scope that are created to meet NASA mission goals Identify and document any organizational or integrated functional work products that are produced in order to execute against identified goals and objectives. 	July 2008
August 2008	<ul style="list-style-type: none"> Conduct Current-State Technology Capability Mapping and Analysis Version 2 <ul style="list-style-type: none"> Identify stakeholder capabilities required to execute mission. Identify list of in-scope applications/technologies. Identify application capabilities. Map application capabilities to required stakeholder capabilities. 	September 2008
October 2008	<ul style="list-style-type: none"> Perform Current-State Process and Systems Mapping Version 2 <ul style="list-style-type: none"> Identify high-level activities or business processes Identify the information flows across activities that deliver end products Identify data types (entities) from information flows Identify information exchanged between applications Map data sources from applications to physical storage locations 	December 2008
January 2009	<ul style="list-style-type: none"> Define Future-State Architecture <ul style="list-style-type: none"> Identify capability gaps from stakeholder/application analysis Determine the workflow/process configuration that will mitigate identified gaps Determine conceptual application configuration that will mitigate identified gaps Review alignment of future-state with Mission execution goals 	February 2009
March 2009	<ul style="list-style-type: none"> Create Transition Plan Version 2 <ul style="list-style-type: none"> Define and scope transition activities Evaluate gaps and opportunities Prioritize transition activities Sequence transition activities Develop transition plan 	April 2009

Table 14 - Enterprise Architecture Task Plan



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IT Security Task Plan

Date	Task	Target Date
January 2008		
February 2008		
March 2008		
April 2008		
May 2008		
June 2008		
July 2008		
August 2008		

Table 15 - IT Security Task Plan

TBD - Dependent Upon Impending Changes
to Agency IT Security Strategy/Policy



Marshall Space Flight Center

Resource Management Task Plan

Date	Task	Target Date
November 2006	<ul style="list-style-type: none"> Baseline assessment of industry-leading best practice competencies/strategies 	Complete
February 2008	<ul style="list-style-type: none"> Reassessment of CMS IT competencies to identify where core functions were performed Monitor Gap Closure Through Monthly Scorecard Review 	Complete
March 2008	<ul style="list-style-type: none"> Monitor Gap Closure Through Monthly Scorecard Review 	Complete
April 2008	<ul style="list-style-type: none"> Review Annual Agency IT Workforce Planning Assessment Requirements Perform Annual Update Agency IT Workforce Planning Template Perform IT Workforce Gap Analysis on Competencies, Skills, Training Prepare Mitigation Plan To Address Gaps 	Apr 30, 2008
May 2008	<ul style="list-style-type: none"> Review & Approve Organizational Training Plan Monitor Gap Closure Through Monthly Scorecard Review 	May 30, 2008
June 2008	<ul style="list-style-type: none"> Monitor Gap Closure Through Monthly Scorecard Review 	Jun 30, 2008
July 2008	<ul style="list-style-type: none"> Monitor Gap Closure Through Monthly Scorecard Review 	Jul 30, 2008
August 2008	<ul style="list-style-type: none"> Monitor Gap Closure Through Monthly Scorecard Review 	Aug 30, 2008

Table 16 - Resource Management Task Plan



Relationship Management Task Plan

Date	Task	Target Date
January 2008	<ul style="list-style-type: none"> Baseline RMF Approach 	Complete
February 2008	<ul style="list-style-type: none"> Provide implementation model for the RMF 	Complete
March 2008	<ul style="list-style-type: none"> Expand strategic IT Solution Architect role into Mission and Mission Support customer segments; Engineering, Office of the Chief Financial Officer, and Office of Strategic Analysis and Communications 	July /2008
April 2008	<ul style="list-style-type: none"> Identify current technology that could sustain the RMF, existing currently within our enterprise, and what is available via COTS: <ul style="list-style-type: none"> Operational: Providing personalized and efficient customer contact through collaboration. Enables a 360-degree customer view during interaction and real-time access to customer history of contact & delivery. Analytical: Supporting the Strategic IT Solution Architect in analyzing operational data like the customer portfolio, service delivery performance, marketing products & services. Collaborative: Integrating the RMF people, processes and technology during customer service delivery interactions, and with timely information back to the customers. 	July /2008
May 2008	<ul style="list-style-type: none"> Train Strategic IT Solution Architects in current IT service capabilities, current requirements discovery process, project management skills, customer experience and satisfaction best practices. 	September 2008
June 2008	<ul style="list-style-type: none"> Strategic IT Solution Architect Team assist in defining the processes of the RMF to include: <ul style="list-style-type: none"> Governing activities for RMF, defining how the IT Solutions Architect engages within the RMF support structure, and how supporting activities execute to discover, communicate, build and deliver IT solutions. Requirements discovery activities for a consistent customer interaction and delivery of IT Solutions. Documenting the customer requirements and mapping them into IT solutions. An IT solution consisting of a skill and a product/service. Collaborating and coordinating the delivery of the IT solution. Integrating with the communication plan that enables the RMF to communicate through customer preferred channels. Defining the performance metrics from the customer's perspective. Defining the customer portfolio management account report card, which illustrates the current customer relationship in terms of product and service mix, spend, projects, innovations and satisfaction. 	Nov 1, 2008
November 2008	<ul style="list-style-type: none"> Develop a customer intelligence data model for integration with a customer management system that enables the RMF with real-time customer information for productive and efficient customer interactions. The customer data model to include foundational (master reference) customer data, relationship (hierarchy) data and transactional (activity) data. 	Jan 1, 2009
January 2009	<ul style="list-style-type: none"> Develop business case to fund the procurement of a customer management system. 	Mar 1, 2009

Table 17 - Relationship Management Task Plan



Marshall Space Flight Center

Innovation Management Task Plan

Date	Task	Target Date
Reporting Activities		
April 2008	<ul style="list-style-type: none"> Complete technology assessment of UNITEs workforce Refresh UNITEs workforce on evaluation reporting process 	
TBD- Dependent on Agency Schedule	<ul style="list-style-type: none"> Review and update evaluation reporting process based on updated Agency IT Innovation Management reporting requirements (NOTE: Future dates may be affected by this task) 	TBD
June 2008	<ul style="list-style-type: none"> Compile quarterly technology evaluation reports 	Jun 27, 2008
Innovation Management Process Optimization and Integration		
April 2008	<ul style="list-style-type: none"> Reach agreement on integration points and processes with Voice of Customer and Enterprise Architecture teams 	Apr 4, 2008
TBD- Dependent on Agency Schedule	<ul style="list-style-type: none"> Review and update Innovation Management process based on updated Agency IT Innovation Management requirements that determine the centralized vs. decentralized structure of the IM function. (Note future tasks dates may be affected by this decision point) 	TBD
May 2008	<ul style="list-style-type: none"> Choose pilot for mapping customer needs to technology exercise 	May 16, 2008
Aug 1, 2008	<ul style="list-style-type: none"> Evaluate first iteration of Innovation Management Process 	Aug 29, 2008
September 2008	<ul style="list-style-type: none"> Integrate lessons learned into evaluation process 	Sep 19, 2008
Strategic Technology Forecasting		
April 2008	<ul style="list-style-type: none"> Determine requirements for technology roadmaps Identify stake-holders Participate in vendor demonstrations Reach stake-holder consensus on requirements 	April 2008
TBD- Dependent on Agency Schedule	<ul style="list-style-type: none"> Review and update innovation management roadmap requirements based on updated Agency IT Innovation Management requirements that determine roadmap standards and Agency vs. Center responsibilities (Note - future task dates may be affected by this decision point) 	TBD- Dependent on Agency Schedule
May 2008	<ul style="list-style-type: none"> Choose technology area for pilot roadmap Determine methodology for producing and disseminating roadmaps 	May 2008
June 2008	<ul style="list-style-type: none"> Deliver first technology pilot roadmap 	Jun 27, 2008
July 2008	<ul style="list-style-type: none"> Stake-holder evaluation of pilot roadmap Implement lessons-learned into roadmap implementation 	Jul 31, 2008



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Date	Task	Target Date
August 2008	<ul style="list-style-type: none"> Identify quarterly targets for roadmap reports Product first quarterly roadmap reports Review first production roadmap delivery 	Oct 17, 2008
November 2008	<ul style="list-style-type: none"> Complete required modifications to technology roadmap exercise 	Nov 14, 2008
Communications		
April 2008	<ul style="list-style-type: none"> Modify ITEP Sharepoint site to accommodate current reporting requirements Determine requirements for Innovation Management communications site 	Apr 27, 2008
TBD- Dependent on Agency Schedule	<ul style="list-style-type: none"> Review and update Innovation Management communications requirements based on updated Agency IT Innovation Management communications requirements that determine the responsibilities, roles, and applications for use at the Center level for Innovation Management. (Note - future task dates may be affected by this decision point) 	TBD
June 2008	<ul style="list-style-type: none"> Deliver prototype Innovation Management communications site 	Jun 13, 2008
July 2008	<ul style="list-style-type: none"> Evaluate prototype communications site with stake holders and customers 	Jul 31, 2008
October 2008	<ul style="list-style-type: none"> Implement and deliver production version of innovation management communications site 	Oct 31, 2008

Table 18 - Innovation Management Task Plan



Marshall Space Flight Center

Service Management & Delivery Task Plan

Date	Task	Target Date
2008	Understand current processes, people (including organization structure), technology, strategy, and controls currently provided to the Center	TBD
TBD	Understand how well the current processes, people, technology, strategy, and controls support the strategy for Improving IT Management at NASA and identifying potential gaps	TBD
TBD	Define a future concept of operations that supports the strategy	TBD
TBD	Identify the processes, people, technology, strategy, controls and appropriate high-level organizational structure needed to support the future concept of operations	TBD
TBD	Perform a Gap Analysis between the current state and the future state which includes identifying process gaps/changes, staffing/training gaps, and accountability gaps	TBD
TBD	Develop detailed organizational design including new organization structure, staffing alignment, key processes, and performance measures	TBD
TBD	Develop a communication and change management plan	TBD
TBD	Develop a transition and implementation plan which includes training plans, staffing plans, and funding plan	TBD

Table 19 - Service Management & Delivery Task Plan



Marshall Space Flight Center

Project Management Task Plan

Date	Task	Target Date
October 2007	<ul style="list-style-type: none"> Identify appropriate PMO approach for the MSFC CIO organizations (Collaborative PMO), desired benefits, and measurement methods for implementing a PMO 	Complete
November 2007	<ul style="list-style-type: none"> Establish Charter for the MSFC CIO PMO Office Initiate PMO Life-cycle Project (LCP) to develop PMO operational approach 	Complete
MSFC CIO Project Management Office Life Cycle Project Definition		
January - June 2008	<ul style="list-style-type: none"> Preliminary MSFC CIO PMO to facilitate and organize MSFC CIO Project Status Reporting to MSFC CMC/IMSB and to OCIO IT PMB and OCIO IMTB Correlate MSFC PMO work products and life cycles with new Agency NPR 7120.7 Associate PMO operational framework and objectives with MSFC CIO governance structure Refine PMO management process, project support functions, and communications strategy Conduct PMO LCP Operational Readiness Review 	Jun 30, 2008
MSFC CIO PMO Release 1.0		
January - June 2008	<ul style="list-style-type: none"> Preliminary MSFC CIO PMO to facilitate and organize MSFC CIO Project Status Reporting to MSFC CMC/IMSB and to OCIO IT PMB and OCIO IMTB Correlate MSFC PMO work products and life cycles with new Agency NPR 7120.7 Associate PMO operational framework and objectives with MSFC CIO governance structure Refine PMO management process, project support functions, and communications strategy Conduct PMO LCP Operational Readiness Review 	Jun 30, 2008
MSFC CIO PMO Operations/Incremental Release 2.0		
June - Nov 2008	<ul style="list-style-type: none"> Refine MSFC CIO PMO Framework to include specific templates related (Project Plan, Risk Register, WBS, Schedule, etc.) Develop collaborative workspaces around the PMO Framework to aid in integrating the project approach, methods and knowledge sharing of the project teams Assess toolsets for a project management system to support MSFC CIO project management practices 	Nov 30, 2008
MSFC CIO PMO Operations/Incremental Release 3.0		
Nov. 2008 - April 2009	<ul style="list-style-type: none"> Refine Project MSFC CIO PMO Framework Assess project management skill sets and develop appropriate training courses and mentorship programs to enhance MSFC CIO project management capabilities Train all project team members in the process, the collaborative workspace, the methodology, and the templates 	Apr 30, 2009

Table 20 - Project Management Task Plan



Performance Measurement & SLA's Task Plan

Date	Task	Target Date
January 2008	<ul style="list-style-type: none"> Draft initial Performance Measurement / SLA approach and submit for review to Center IT Implementation Team 	Complete
February 2008	<ul style="list-style-type: none"> Review and update CIO scorecard measures based on revised reporting requirements 	Complete
March 2008	<ul style="list-style-type: none"> Review and update CIO scorecard measures based on revised reporting requirements Provide initial overview of performance measurement and SLA implementation plan to Center IMSB for review/approval 	Complete
April 2008	<ul style="list-style-type: none"> Conduct monthly review and update of CIO scorecard measures based on revised reporting requirements and new input from modified SLAs Determine additional organizational excellence measures into existing scorecard <ul style="list-style-type: none"> Determine appropriate measures for each CIO Core Capability Determine owner, source of data, calculation, and reporting frequency of measures Incorporate performance measures into the detailed organizational design Capture, collect, and report on the data necessary to calculate the performance measures 	Apr 30, 2008
May 2008	<ul style="list-style-type: none"> Conduct annual review of CIO scorecard Conduct annual review of existing application and infrastructure SLAs Conduct monthly review and update of CIO scorecard measures based on revised reporting requirements and new input from modified SLAs 	May 30, 2008
June 2008	<ul style="list-style-type: none"> Conduct monthly review and update of CIO scorecard measures based on revised reporting requirements and new input from modified SLAs Identify new application portfolio management measures and incorporate into operational scorecard Develop revised application and infrastructure SLAs 	Jun 30, 2008
July 2008	<ul style="list-style-type: none"> Conduct monthly review and update of CIO scorecard measures based on revised reporting requirements and new input from modified SLAs 	Jul 30, 2008
August 2008	<ul style="list-style-type: none"> Conduct monthly review and update of CIO scorecard measures based on revised reporting requirements and new input from modified SLAs 	Aug 30, 2008

Table 21 - Performance Measurement Task Plan



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Appendix



Marshall Space Flight Center

Acronym List

CEA	Chief Enterprise Architect
CFO	Chief Financial Officer
CIO	Chief Information Officer (MSFC)
CMC	Center Management Council
CMS	Competency Management System
CM&O	Center Management and Operations
COOP	Continuity of Operations Planning
COTR	Contracting Officers Technical Representative
CPIC	Capital Planning and Investment Control
CSCI	Computer Software Configuration Items
CSO	Computer Security Official
DOCTR	Delivery Order Contracting Officers Technical Representative
DR	Disaster Recovery
EA	Enterprise Architecture
ED	Engineering Directorate
G&A	General and Administrative
IEMP	Integrated Enterprise Management Program
IM	Innovation Management
IRB	Investment Review Board
IRM	Information Resources Management
ISCB	Information Systems Change Board
IT	Information Technology
ITM	IT Manager
ITPMB	IT Project Management Board
ITPMO	IT Project Management Office
ITOPS	IT Operations Board
ITSIB	IT Strategy and Investment Board
ITSM	IT Security Manager



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ITEP	IT Evaluation Planning
NISC	NASA Information Support Center
NPD	NASA Policy Directive
NPR	NASA Procedural Requirements
MDs	Mission Directorates
MEAAC	MSFC Enterprise Architecture Advisory Committee
MSFC	Marshall Space Flight Center
MSO	Mission Support Organization
OB	Operations Board
OCE	Office of Chief Engineer
OCFO	Office of the Chief Financial Officer
OCIO	Office of the CIO (HQ)
ODIN	Outsourcing Desktop Initiative for NASA
OMC	Operations Management Council
OSAC	Office of Strategic Analysis and Communications
OSPP	Office of Security and Program Protection
PA&E	Program Analysis and Evaluation
PMB	Program Management Board
PMO	Project Management Office
PPBE	Program Planning Budget Execution
PR	Purchase Requisition
RM	Relationship Manager
SaMS	Science and Mission Systems
SDG	Software Development Guide
SDLC	Software Development Life Cycle
SEF	Software Engineering Framework
SEP	Software Engineering Process
SLA	Service Level Agreement
S&MA	Safety and Mission Assurance Office
SMC	Strategic Management Council
SOA	Service Oriented Architecture
SPC	Strategic Planning Council
SPIP	Software Process Improvement Plan
UNITeS	Unified NASA Information Technology Services



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Draft Charters - MSFC IT Governance Entities

- MSFC IT Implementation Plan Transition Team (ITIP Transition Team)
- MSFC IT Strategy and Investment Board (MSFC ITSIB)
- MSFC Enterprise Architecture Advisory Committee (MEACC)



Marshall Space Flight Center

Charter

George C. Marshall Space Flight Center
Marshall Space Flight Center Alabama 35812

MSFC IT Implementation Plan Transition Team (ITIP Transition Team)	MPD	Charter Number: MC -
	Effective Date: DRAFT	

Marshall Space Flight Center IT Implementation Plan Transition Team

PURPOSE

In response to a request from the Agency CIO, The MSFC IT Implementation Plan Transition Team (ITIP Transition Team) has been formed to develop MSFC implementation plan for the new enterprise-level strategic direction for the management of information technology (IT) as approved by the Agency Senior Management Council (SMC). Reference the NASA Office of the Chief Information Officer's "Strategy for Improving IT Management at NASA" dated December 4, 2007.

The Agency "Strategy for Improving IT Management At NASA" provides clear guidance and direction for change in how IT will be managed within the Agency. This strategy encompasses five specific directions and initiative areas:

- IT Governance
- IT Financial Management
- IT Application Portfolio Management
- IT Infrastructure
- Organizational Design and Staffing

Per the guidance issued by the NASA Office of the Chief Information Officer, the ITIP Transition Team will develop transition plans that identify the Center level strategy and plans to address the five key strategy areas and provide the competencies and functions outlined in the strategy document. The Center plan submission is due April 4, 2008, 2008.



Marshall Space Flight Center

This document defines the purpose, mission, and objectives of the ITIP Transition Team. It defines the membership, roles and responsibilities, method of operation, frequency of meetings, and duration of assignment.

AUTHORITY

NASA Office of the Chief Information Officer's "Strategy for Improving IT Management at NASA" dated December 4, 2007.

RESPONSIBILITIES

The objectives of the ITMT are to deliver an actionable Center IT Implementation Plan by April 4, 2008, that does the following:

- Defines the overall Center transition approach
- Identifies the current Center Governance structure
- Identifies the planned IT Governance structure that aligns with the Agency CIO IT governance model
- Defines the CIO role in the Center IT Acquisition Process
- Defines the realignment necessary to meet NPD 1000.3 and Agency defined IT strategy
- Identifies the process for Center organizational alignment with core CIO functions
- Documents the Center CIO approach for fulfilling the relationship manager and enterprise architect functions
- Identifies service level agreements and metrics for IT service delivery
- Documents the Center transition plan and schedule for change

METHOD OF OPERATION

- The Chairperson shall convene the ITIP Transition Team to discharge the responsibilities and perform the functions of the team.
- The results of the teams assessments and decisions shall be documented in the form a draft Center Implementation Plan that will be reviewed, approved, and provide to the NASA Chief Information Officer.
- Attendance and participation by personnel assigned to the team by their respective organizations shall be required.
- The MSFC ITIP Transition Team Secretariat shall be responsible for overall coordination of the team activities, including presentation outlines, meeting agendas, assignments for preparation of briefing materials, and records management.



Marshall Space Flight Center

FREQUENCY OF MEETINGS

The MSFC ITIP Transition Team shall meet on a weekly basis, or more frequently if required. A quorum is established when representatives for at least two-thirds of the member organizations participate in a meeting. If a designated representative is unable to participate, then an approved alternate is acceptable. However, alternates are expected to speak authoritatively for their respective organizations. The Chairperson makes decisions after discovery, discussion, and debate.

MEMBERSHIP

Chairperson: Johnny Stephenson, MSFC Office of Strategic Analysis and Communications

Membership shall be comprised of the following standing members:

- Office of Center Operations, Melvin Scruggs
- Office of the Chief Financial Officer, Gary Gray, Clarence Gearhart
- Office of the Chief Information Officer, David Earnest, Greg Black
- Office of Human Capital, Wendy Sullivan
- Office of Procurement, Dwight Clark
- Office of Strategic Analysis and Communications, Keith Swearingen
- Ares Project Office, Burt Bright, John Rowan
- Engineering Directorate, Barry Musick, Pat McDuffee, Robert Robb
- Safety and Mission Assurance Directorate, Dane Garver
- Science and Mission Systems Office, Scott Storey
- Secretariat, Maureen LaComb

- Other members as deemed necessary by the chairperson

DURATION OF APPOINTMENT

Members shall serve until appointments are rescinded by memorandum of membership from the ITIP Transition Team chairperson.



Marshall Space Flight Center

Charter

George C. Marshall Space Flight Center
Marshall Space Flight Center Alabama 35812

Marshall Space Flight Center IT Strategy and Investment Board (IT SIB)	MPD	Charter Number: MC -
	Effective Date: DRAFT	

Marshall Space Flight Center IT Strategy and Investment Board (IT SIB) Charter

PURPOSE

The MSFC IT Strategy and Investment Board provides a Center-level forum to discuss IT strategy, IT architecture, IT investment prioritization and selection when visibility, integration, and understanding are needed to drive alignment to Center and Agency goals and objectives.

The ITSIB is responsible for recommending decisions to MSFC governing councils regarding implementing IT strategy, architecture, investment prioritization and selection at the Center level, and ensuring implementation of NASA IT policies and processes.

The Director, MSFC Office of the CIO serves as the IT SIB Chair, presenting analysis, recommendations and decisions on behalf of the Center to the Integrated Management Systems Board. The ITSIB is a subcommittee of the MSFC Integrated Management Systems Board (IMSB).

The Chair makes decisions after discovery, discussion, and debate.

AUTHORITY

NPD 1000.1 "Strategic Management and Governance Handbook"
NPR 1000.2 "NASA Strategic Management Handbook"
NPD 1000.3 "The NASA Organization w/Change"
NPD 2830.1 "NASA Enterprise Architecture"
NPR 2830.1 "NASA Enterprise Architecture Procedures"



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MPD 2800.1 "Management of Information Technology Systems and Services at MSFC"

RESPONSIBILITIES

The MSFC IT SIB, as a subcommittee of the MSFC IMSB shall be responsible for performing the following functions:

- Ensuring alignment and implementation of MSFC IT strategy, policy, investments, and cross-cutting processes consistent with NASA policy and guidance.
- Review and approval of the Center's Information Technology investment portfolio for Science and Engineering applications, Project Management applications, Business Management applications, Infrastructure Applications, and Infrastructure Services.
- Review of the Center's Highly Specialized information technology investment portfolio.
- Review and approval of the Center's Enterprise Architecture developed by the MSFC Enterprise ARchitecture Advisory Committee (MEAAC).
- Review and recommendation of the Center IT investment portfolio performance and key decision point approvals and actions.

METHOD OF OPERATION

- The Chairperson shall convene the IT SIB to discharge the responsibilities and perform the functions of the Board.
- A quorum is established when representatives for at least two-thirds of the member organizations participate in a meeting.
- The results of IT SIB assessments and decisions shall be documented in the form of findings, recommendations, required actions, and meeting minutes.
- Attendance and participation by other Center personnel shall be as determined by the Chairperson and may be recommended by the members.
- The MSFC IT SIB Secretariat shall be responsible for overall coordination of the Committee activities, including presentation outlines, meeting agendas, assignments for preparation of briefing materials, and records management.

FREQUENCY OF MEETINGS

The MSFC IT SIB shall meet on a quarterly basis, or more frequently, if required. If a designated representative is unable to participate, then an approved alternate is acceptable. However, alternates are expected to speak authoritatively for their respective organizations.



Marshall Space Flight Center

MEMBERSHIP

Chairperson: MSFC Office of the Chief Information Officer, Director

Membership shall be comprised of the following standing members:

- MSFC Assistant Director for Technology & Chief Technologist (currently vacant position)
- Office of Strategic Analysis and Communications, Deputy Director
- Office of Center Operations, Deputy Director
- Office of the Chief Financial Officer, Deputy Director
- Office of Human Capital, Deputy Director
- Office of Procurement, Deputy Director
- Ares Project Office, Deputy Director
- Engineering Directorate, Deputy Director
- Safety and Mission Assurance Directorate, Deputy Director
- Science and Mission Systems Office, Deputy Director
- Shuttle Propulsion Office, Deputy Director
- Secretariat

DURATION OF APPOINTMENT

This charter shall be in effect for a period of 3 years and will be reviewed/renewed as appropriate.

Members shall serve until appointments are rescinded by memorandum of membership from the ITSIB chairperson.



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Charter

George C. Marshall Space Flight Center
Marshall Space Flight Center Alabama 35812

MSFC Enterprise Architecture Advisory Committee (MEAAC) Charter	MPD	Charter Number: MC -
	Effective Date: DRAFT	

MSFC Enterprise Architecture Advisory Committee (MEAAC) Charter

PURPOSE

This charter institutes an MSFC Enterprise Architecture Advisory (MEAAC) Committee to direct, oversee, and approve the MSFC enterprise architecture design and operating configurations that affect MSFC IT investments in the Engineering Applications, Science Applications, Project Management Applications, Business Management Applications, IT Infrastructure Applications, and IT Infrastructure Services portfolios.

The MEAAC reviews, approves, and controls changes to the baseline configuration of the MSFC enterprise architecture.

The MEAAC Committee is established to aid the MSFC ITSIB in accomplishing the following goals:

- Ensuring integration, value, and security of the information architecture and the tools that are used in the creation, discovery, analysis, and dissemination of data,
- Making fiscally responsible investment decisions by eliminating functional redundancies in information systems, and
- Ensuring that MSFC fulfills its responsibilities for mission success with the same disciplined and rigorous approach to information systems design and management as it applies to flight systems design and management.

AUTHORITY

NPR 1000.2 "NASA Strategic Management Handbook"
NPD 1000.3 "The NASA Organization with Change"



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NPD 2830.1 "NASA Enterprise Architecture"

NPR 2830.1 "NASA Enterprise Architecture Procedures"

MPD 2800.1 "Management of Information Technology Systems and Services at MSFC"

RESPONSIBILITIES

The MEAAC shall be responsible to the MSFC ITSIB for the execution of enterprise architecture activities including the following:

- Establishing the guiding principles for the MSFC Enterprise Architecture.
- Ensuring architectural direction is aligned with the Agency mission, strategy, and enterprise architecture.
- Defining the MSFC enterprise architecture roadmap including version updates and planned sun-setting.
- Baselining and controlling information systems configuration documents and changes to the MSFC applications and IT infrastructure portfolios.
- Coordinating and controlling detailed information system functional and operating requirements, including resolving conflicting requirements.
- Analyzing and prioritizing IT investments within the MSFC applications and IT infrastructure portfolios and recommending the IT portfolio of investments to the ITSIB.
- Monitoring the performance of and ensuring compliance with performance standards defined by the Agency for each portfolio.
- Recommend MSFC enterprise architecture changes and additions to the MSFC ITSIB for decision.

METHOD OF OPERATION

- The Chairperson shall convene the MEAAC to discharge the responsibilities and perform the functions of the committee.
- A quorum is established when representatives for at least two-thirds of the members participate in a meeting.
- The results of the Committee's assessments and decisions shall be documented in the form of findings, recommendations, required actions and meeting minutes.
- The MEAAC shall establish and appoint membership to various working groups for the following purposes:
 - Implement a Capital Planning and Investment Control (CPIC) process for information technology investments that is integrated with the MSFC Center CPIC process.
 - Documenting the current-state of the MSFC Mission & Engineering Enterprise Architecture
 - Defining the future-state MSFC Mission and Engineering Enterprise Architecture.
 - Developing the transition plan for achieving the future-state MSFC Mission and Engineering Enterprise Architecture.
 - Implementing initiatives as defined in the transition plan or other initiatives that arise out of the normal course of business.



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- The MEAAC Secretariat shall be responsible for overall coordination of the MEAAC activities, including presentation outlines, meeting agendas, assignments for preparation of briefing materials, and records management.
- Attendance and participation by other Center personnel shall be as determined by the Chairperson and may be recommended by the members.
- The Chair makes decisions on behalf of the MEAAC after discovery, discussion, and debate.

FREQUENCY OF MEETINGS

The MEAAC Committee will meet on a monthly basis, or more frequently, as required. If a designated representative is unable to participate, then an approved alternate is acceptable. However, alternates are expected to speak authoritatively for their respective organizations.

MEMBERSHIP

Chairperson: MSFC Chief Enterprise Architect

Membership shall be comprised of the following standing members:

- MSFC Chief Enterprise Architect (initial chair)
- MSFC Solutions Architect(s) - Highly Specialized IT
- MSFC Solutions Architect(s) - Engineering Applications
- MSFC Solutions Architect(s) - Science & Mission Systems Applications
- MSFC Solutions Architect(s) - Project Management Applications
- MSFC Solutions Architect(s) - Business Management Applications
- MSFC Solutions Architect(s) - Infrastructure Applications
- MSFC Solutions Architect(s) - Infrastructure Services
- Secretariat (non-voting member)
- Ad hoc members shall include: Other members as deemed necessary by the chairperson

Chair rotates every 6-9 months among MSFC Chief Enterprise Architect, Engineering Applications Portfolio Solutions Architect, Science Applications Portfolio Solutions Architect, Project Management Applications Solutions Architect, Business Management Applications Solutions Architect, and IT Infrastructure Solutions Architect.

DURATION OF APPOINTMENT

This charter shall be in effect for a period of 3 years and will be reviewed/renewed as appropriate.



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IT Solutions Architect

Sample Draft Position Description

[Note: Not Meant To Be Representative of Any Specific Grade Within An Organization]

Introductory Statement

- Serves as an Information Technology Solutions Architect within the MSFC [insert organization name here]. Responsible for overseeing the planning, design, development, and implementation of an enterprise architecture segment and ensures development and documentation of standards, policies, and principles to support the integration of mission critical business, application, information, and technology architectures within the [insert IT portfolio segment here] at MSFC.

Enterprise Architecture Planning and Implementation 50%

- Serves as an expert in an enterprise architecture specialty area for a major Agency organization, such as a regional office, directorate, or Center.
- Participates on the Center enterprise architecture advisory committee, providing authoritative architecture solutions for MSFC and the [insert IT portfolio segment here]. Knowledgeable of the understanding, application, and use of the Federal Enterprise Architecture Framework.
- Responsible for planning, design, development, and implementation of an information technology solutions architecture that addresses mission-critical objectives within the [insert IT portfolio segment here]. Defines and ensures Center documentation standards, policies, and principles for integration of the business, application, information, and technology architectures.
- Produces an accurate representation of the business environment, strategy, and critical success factors, and provides comprehensive documentation of business unit and key mission processes. Develops views of the systems and data that support these processes.
- Develops and implements standards that define what information technologies and products are approved for use within the [insert IT portfolio segment here]. Develops guidelines on how to best apply technology standards in creating business and technical systems and applications. Interprets and applies Government-wide and industry best practices when developing enterprise architecture processes and methodologies.
- In collaboration with the MSFC Chief Enterprise Architect, ensures an integrated enterprise architecture that addresses improved decision making and adaptability to changing demands or market conditions. Works to eliminate inefficient and redundant processes, and to optimize the use of organizational assets.
- Defines the hardware, operating systems, programming, and networking solutions used by the Agency. Maintains currency in emerging technologies critical to the evolution of the Agency enterprise architecture with more efficient and effective standards, infrastructure, and applications.



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IT Project Planning and Management 20%

- Plans and manages significant IT projects involving innovative concepts or approaches where precedents do not exist, and large numbers of people or multiple agencies are affected. Plans and develops long-range objectives and milestones for IT projects that involve substantive, mission-oriented programs, such as those associated with the U.S. Space Exploration Policy. Coordinates and manages IT projects with high complexity or risk in support of NASA's engineering, science, exploration, and mission objectives within the [insert IT portfolio segment here]. Serves as expert consultant and manages planning, integration and implementation of collaborative business and technical IT solutions. Develops and implements project management procedures, tools, templates, activities, and infrastructure.
- Determines the appropriate products or services with stake-holder clients to define the project scope, requirements, and deliverables. Designs cost-benefit studies to implement projects with the most efficient use of human capital and material resources at the lowest cost. Manages project resources and monitors output to mitigate risks. Takes immediate corrective action when problems arise.
- Integrates configuration management, information technology architecture, infrastructure design, and systems integration aspects into IT project plans. Ensures that all aspects of the project are aligned with the Government-wide enterprise architecture and takes future infrastructure requirements into account.
- Identifies standards for change management and controls the change process by reviewing configuration change requests.
- Ensures the development of information systems security plans and procedures, and ensures that they are in compliance with Federal laws, regulations, policies, and standards.
- Ensures that appropriate product-related training and documentation are developed and made available to customers before the project is completed.

Contractor Oversight for Computer Science Projects or Programs 10%

- Initiates contact and provides expert technical advice and direction to contractor professionals. Serves as a senior technical monitor and keeps the Contracting Officer informed on progress, proposed contract modifications, validity of claims, analysis of proposals, and assessment of contract time extensions.
- Work complexities require the development of alternate solutions to reduce time and costs, versatility and innovation, and short cuts or compromises that are considered risky. Resolves unusual demands caused by extraordinary urgency, safety, or economic restraints. Monitors off-site research that has been contracted out. Performs additional data systems and analysis work.



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IT Policy/Guidelines Development 10%

- Develops policies, guidelines, and standards for the planning, development, integration, implementation, and evaluation of information technology (IT) systems and subsystems that meet overall information needs of multiple major organizational units.
- Analyzes statutory requirements against existing directives to assess the degree of change necessary to comply with the new requirements. Coordinates comments on revised directives as part of the review process and incorporates comments or resolves issues into the final directive. Analyzes feasibility studies, proposals, and in-depth analyses of current requirements and forecast trends for future needs. Keeps abreast of changing and emerging technology. Makes recommendations on adopting changes.
- Leads major Agency-wide IT policy development efforts. Directs work assigned to a project team, reviewing and refining the final products prior to submission to management. Coordinates policy dissemination, manages policy maintenance, and develops mechanisms to measure policy effectiveness and compliance.

Technical Advice and Guidance In Computer Science 5%

- Serves as an expert consultant on broad projects and programs with Center-wide impact. Consults with all levels of management, Agency personnel, other Federal agencies, and with foreign and commercial organizations in the research, development, or use of information technology applications tools, software systems, hardware, and equipment. Establishes, maintains, and serves as the primary liaison within the [insert IT portfolio segment here] and works closely with their representatives to ensure that concerns such as proper systems requirements definition and adequate funding are met. Performs additional data systems and analysis work.

IT Business Research and Development 5%

- Responsible for establishment of a viable relationship with a wide variety of Federal client agencies that manage national and world-wide programs. Conducts extensive research to gain a comprehensive understanding of client agencies' business environments, decision-making processes, budgets, and IT strategies. Consults with high-level officials of potential and existing agency clients and Industry Partners to clearly and forcefully communicate the value-added of partnering with IT Solutions.
- In response to customer requirement concepts, assembles a multi-disciplined team of IT and Industry Partner individuals with the appropriate skill sets to formulate an effective IT Solution. Plans and manages delivery and acceptance of complex business IT solutions. Plans, manages, and integrates separate functions of production, funding, supply, maintenance, acquisition, and quality control into activities needed to sustain IT systems throughout the life cycle (5-10 years). Reviews and approves terms and conditions set forth in acquisition negotiations, contract plans, budgets, and changes to the scope of work to be accomplished by the contractor.
- Monitors the performance of programmatic activities through the review and analysis of reports. Identifies and implements IT process reform initiatives to reduce total program cost and more effectively meet customer requirements.



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OTHER SIGNIFICANT FACTS:

- May serve as technical monitor between the contractor and the Contracting Officer by monitoring the contractor's performance and delivery of the final products and/or services under the contract.

Factor Knowledge Required by the Position

- Mastery of, and skill in applying, advanced IT principles, concepts, methods, standards, and practices sufficient to accomplish assignments such as: develop and interpret policies, procedures, and strategies governing the planning and delivery of services throughout the Agency; provide expert technical advice, guidance, and recommendations to management and other technical specialists on critical IT issues; apply new developments to previously unsolvable problems; and make decisions or recommendations that significantly influence important Agency IT policies or programs. Mastery of, and skill in applying, most of the following: interrelationships of multiple IT specialties; the Agency's IT architecture; new IT developments and applications; emerging technologies and their applications to business processes; IT security concepts, standards, and methods; project management principles, methods, and practices including developing plans and schedules, estimating resource requirements, defining milestones and deliverables, monitoring activities, and evaluating and reporting on accomplishments; and oral and written communication techniques. Ensures the integration of IT programs and services, and develops solutions to integration/interoperability issues. Designs, develops, and manages systems that meet current and future business requirements and apply and extend, enhance, or optimize the existing architecture. Manages assigned projects. Communicates complex technical requirements to non-technical personnel. Prepares and presents briefings to senior management officials on complex/controversial issues.
- Knowledgeable of the understanding, application, and use of the Federal Enterprise Architecture Framework. Federal Enterprise Architecture certification is desired, but not required.



Roles & Responsibilities

Solutions Architect, Portfolio Manager, IT Manager

DRAFT FOR DISCUSSION ONLY

	IT Solutions Architect	Portfolio Manager	IT Manager
Responsibilities	<ul style="list-style-type: none"> Acts as the architectural interface between the customer organization and the Office of CIO Assists the Center Enterprise Architect to define the target architecture for the Center and integrate Center requirements with Agency solutions Serves as subject matter expert for understanding the breadth of IT as it crosses multiple organizations and Centers Translates customer requirements for a specific portfolio into proposed solutions that are integrated Assists in the development of Summary of Investment Business Cases and investment priorities within their portfolio 	<ul style="list-style-type: none"> Acts as the primary point of contact for each of the defined portfolio of applications; integrating requirements across organizations and projects/ programs Maintains visibility of existing applications and proposals for new applications across the portfolio Coordinates with the Solutions Architect for the implementation of the applications. Could be considered a dual role for an existing Solutions Architect or IT Manager 	<ul style="list-style-type: none"> Acts as primary organizational point of contact within a program or directorate for internal activity and interface to the Portfolio Managers/ Solutions Architect Maintains visibility of existing and new IT activity in the organization, understanding the cost, schedule, and risk associated with that activity Acts on behalf of the organization for IT related issues
Level of Authority	<ul style="list-style-type: none"> Reports to and acts on behalf of IS01 (Direct or matrixed) Matrixed personnel report to and acts on behalf of the XX01 level of their reporting org Peer to Division/Office Managers within the org 	<ul style="list-style-type: none"> Reports to and acts on behalf of XX01 Has decision authority within the confines of respective portfolio 	



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